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ҚАЗАҚСТАН ХИРУРГИЯСЫНЫҢ ХАБАРШЫСЫ

ВЕСТНИК ХИРУРГИИ КАЗАХСТАНА

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ВЕСТНИК ХИРУРГИИ КАЗАХСТАНА
BULLETIN OF SURGERY IN KAZAKHSTAN

әр тоқсанда шығып тұратын А.Н. Сызғанов атындағы Ұлттық ғылыми хирургия орталығының ғылыми-тәжірибелік журналы
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EFFICACY OF PERCUTANEOUS TRANSHEPATIC CHOLECYSTOSTOMY IN ACUTE OBSTRUCTIVE CHOLECYSTITIS

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Abstract

Acute obstructive cholecystitis is a common disease with a significant risk of mortality and complications. Active surgical tactics, such as open and laparoscopic access, pose a significant risk for elderly patients with concomitant diseases on the background of acute cholecystitis. The aim of our study is to analyze the effectiveness of percutaneous transhepatic cholecystostomy (PTCS) in acute obstructive cholecystitis (AOC) and subsequent laparoscopic cholecystectomy (LCE).

Materials and methods. *Retrospectively, we analyzed 64 patients treated with AOC in the period from 2017 to 2021 at the NSCS named after A.N. Syzganov. We divided them into 2 groups depending on surgical treatment. The first group: patients who were performed PTCS (n=29) at the first stage. The second stage, LCE was performed during the waiting period from 3 days to 72 days. The second group: patients who underwent LCE without drainage of the gallbladder (n=35). Also, the patients of the first group were divided into 3 subgroups depending on the waiting time: group A - LCE was performed within 10 days after PTCS, subgroup B - LCE was performed after from 2 to 4 weeks (n=12), patients of the subgroup C, LCE were performed after 4 weeks after PTCS. Preoperative, intraoperative data and postoperative complications were analyzed.*

Results. *According to preoperative data, there was no significant difference in body temperature, laboratory data and concomitant diseases. The statistical difference was revealed only in the age of patients (65.3±9.0 vs 53.4±15.4). The duration of the operation in the second group of LCE was longer compared to the first group, but no significant difference was detected (108.1 ± 30.5 vs 117.9 ± 39.9). In the postoperative period after LCE, complications were observed in 5 (14.2%) cases: bleeding in 4 (11.4%) cases and suppuration of the postoperative wound in 1 (2.8%) case. Conversion was performed in 10 (15.6%) cases, and in one (1.5%) case, the choledochal wall was injured intraoperatively. There was no significant difference between groups A, B and C.*

Conclusion. *The use of two-stage treatment significantly reduces the conversion to open surgery, significantly reduces postoperative complications and hospital stay in the postoperative period. According to the results of our research, the most optimal interval between PTCS and LCE is a period of more than 4 weeks.*

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Conflict of interest
The authors declare that they have no conflicts of interest

Keywords:
Acute obstructive cholecystitis, Percutaneous transhepatic cholecystostomy, Laparoscopic cholecystectomy, Gallstone disease

Жедел обструктивті холецистит кезінде тері және бауыр арқылы өтетін холецистостомияның тиімділігі

Оспан Ж.Р.[1], Досханов М.О.[1,2], Серікұлы Е.[2], Мукажанов Д.Е.[2], Хаджиева А.А.[1], Тилеуов С.Т.[2], Скакбаев А.С.[2], Аскеев Б.Т.[2], Баймаханов Ж.Б.[1,2], Каниев Ш.А.[1,2], Чорманов А.Т.[2], Баймаханов Б.Б.[2,1], Сейсембаев М.А.[2]

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Аңдатпа

Жедел обтурациялық холецистит – өлім-жітім және асқыну қаупі жоғары кең таралған ауру. Жанама аурулары бар егде жастағы науқастарға жедел холецистит кезінде, қазіргі уақыттағы хирургиялық тактика, ашық және лапароскопиялық қол жетімділік айтарлықтай қауіп төндіреді. Біздің зерттеуіміздің мақсаты - жедел обструктивті холецистит кезінде тері бауыр арқылы қойылатын холецистостомияның тиімділігі және одан кейінгі лапароскопиялық холецистэктомияны талдау.

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Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Материал және әдістер. *Біз ретроспективті түрде А.Н. Сызғанов атындағы ҰҒХО-да 2017 жылдан 2021 жылдар аралығында жедел обтурациялық холециститпен емделген 64 науқасты талдадық, оларды хирургиялық емдеу көлеміне байланысты 2 топқа бөлдік. Бірінші топ науқастарына: бірінші кезеңде ТБХС (N=29), екінші кезеңде, 3 күннен 72 күн аралығында күту мерзімі өткеннен кейін ЛХЭ жасалды. Екінші топ науқастарына: өт қабын дренаждамай ЛХЭ жасаған науқастар (N=35). Сондай-ақ, бірінші топтағы науқастар күту уақытына байланысты 3 топшаға бөлінді: А топшасы - ЛХЭ ТБХС орнатылғаннан кейін 10 күн ішінде орындалды, В топшасы - ЛХЭ ТБХС орнатылғаннан кейін 2 аптадан 4 апта аралығында орындалды (N=12), С топшасы - ЛХЭ ТБХС - тан кейін 4 аптадан кейін орындалды. Операция алдындағы, операция кезіндегі деректер және операциядан кейінгі асқынулар талданды.*

Нәтижелер. *Операция алдындағы мәліметтер мен дене қызуында, зертханалық мәліметтерде, қосалқы ауруларда және сәйкес өрісте айтарлықтай айырмашылық анықталған жоқ. Статистикалық айырмашылық тек науқастардың жасында анықталды (65.3±9,0 vs 53,4±15,4). ЛХЭ операция ұзақтығы бірінші топпен салыстырғанда, екінші топта ұзағырақ болды, бірақ айтарлықтай айырмашылық анықталмады (108,1 ± 30,5 vs 117,9 ± 39,9). ЛХЭ-дан соң операциядан кейінгі кезеңде 5 (14,2%) жағдайда асқынулар байқалды: 4 (11,4%) жағдайда қан кету және 1 (2,8%) жағдайда операциядан кейінгі жараның іріңдеуі. Операциядан кейінгі жараның іріңдеуіне байланысты жара, қайталама кернеумен жазылды. Лапаротомияға конверсия 10 (15,6%) жағдайда жүргізілді, бір (1,5%) жағдайда операция ағымында холедохтың қабырғасы зақымдалды. Сондай-ақ, А, В және С топтары арасында айтарлықтай айырмашылық анықталған жоқ.*

Қорытынды. *Осылайша, жедел обструктивті холецистит кезінде екі сатылы емдеуді қолдану (ТБХС, ЛХЭ) ашық операцияға конверсияны едәуір азайтады, операциядан кейінгі асқынуды сенімді түрде азайтады және операциядан кейінгі кезеңде төсек-орын күндерін азайтады. Біздің зерттеу нәтижелерімізге сәйкес, ТБХС пен ЛХЭ арасындағы ең оңтайлы аралық мерзімі 4 аптадан астам уақыт.*

Түйін сөздер:
жедел обтурациялық холецистит, тері бауыр арқылы холецистостомия, лапароскопиялық холецистэктомия, өт тас ауруы

Эффективность чрескожной чреспеченочной холецистостомии при остром обструктивном холецистите

Оспан Ж.Р.[1], Досханов М.О.[1,2], Серікұлы Е.[2], Мукажанов Д.Е.[2], Хаджиева А.А.[1], Тилеуов С.Т.[2], Скакбаев А.С.[2], Аскеев Б.Т.[2], Баймаханов Ж.Б.[1,2], Каниев Ш.А.[1,2], Чорманов А.Т.[2], Баймаханов Б.Б.[2,1], Сейсембаев М.А.[2]

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Аннотация

Острый обтурационный холецистит - распространенное заболевание со значительным риском смертности и осложнений. Активная хирургическая тактика, как открытый и лапароскопический доступ, представляет значительный риск для пациентов пожилого возраста с наличием сопутствующих заболеваний на фоне острого холецистита. Целью нашего исследования является анализ эффективности чрескожной чреспеченочной холецистостомии (ЧЧХС) при остром обтурационном холецистите и последующем лапароскопической холецистэктомии (ЛХЭ).

Материал и методы. *Ретроспективно нами было проанализировано 64 пациентов пролеченных с остром обтурационном холециститом в период с 2017 года по 2021 год в ННЦХ им. А.Н. Сызганова, которых мы разделили на 2 группы в зависимости от объема хирургического лечения. Первая группа: пациенты, которым первым этапом установлена ЧЧХС (n=29), вторым этапом, было произведена ЛХЭ в период выжидания от 3 дней до 72 дней. Вторая группа: пациенты, которым была выполнена ЛХЭ без дренирования желчного пузыря (n=35). Также пациенты первой группы разделены на 3 подгруппы в зависимости от время выжидания: группа А - ЛХЭ выполнена в течение 10 дней после установки ЧЧХС, подгруппа В - ЛХЭ выполнена через от 2 недель по 4 недель (n=12), пациентам подгруппы С ЛХЭ выполнена более чем 4 недель после ЧЧХС. Были проанализированы предоперационные, интраоперационные данные и послеоперационные осложнения.*

Результаты. *По предоперационным данным, значительной разницы в поле, температуре тела, лабораторным данным и сопутствующих заболеваниях не выявлена. Статистическая разница была выявлена только в возрасте пациентов (65.3±9,0 vs 53,4±15,4). Продолжительность операции во*

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Ключевые слова:
Острый обтурационный холецистит, чрескожная чреспеченочная холецистостомия, лапароскопическая холецистэктомия, желчнокаменная болезнь

второй группе ЛХЭ было больше по сравнению с первой группой, однако значительной разницы не выявлены (108,1 ± 30,5 vs 117,9 ± 39,9). В послеоперационном периоде после ЛХЭ в 5 (14,2%) случаях наблюдались осложнения: кровотечение 4 (11,4%) случая и нагноение послеоперационной раны в 1 (2,8%) случае. Рана заживала вторичным натяжением в связи с нагноением послеоперационный раны. Конверсия на лапаротомию была произведена в 10 (15,6%) случаях, в одном (1,5%) случае интраоперационно была повреждена стенка холедоха.Также значительной разницы между группами A, B и C, не выявлена.

***Вывод.** Таким образом при остром обтурационном холецистите применение двухэтапного лечение (ЧЧХС, ЛХЭ) значительно уменьшает конверсию на открытую операцию, достоверно снижает послеоперационное осложнение и меньше койко дней в послеоперационном периоде. Согласно результатами наших исследований, самый оптимальный интервал между ЧЧХС и ЛХЭ является срок более 4 недель.*

Relevance

Acute obstructive cholecystitis (AOC) is a common disease with a significant risk of mortality and complications, especially in severe cases of general condition against the background of comorbidities [1]. The “gold standard” for the treatment of this disease is laparoscopic cholecystectomy (LCE) [2]. Traditionally, “open” surgery is reserved for destructive forms of AOC with peritonitis and severe inflammation [3]. Despite the advances made by medical science: ultrasound diagnostics, endosurgical and minimally invasive methods of treating acute cholecystitis still remain the most urgent problem in surgery [4]. According to many authors, about 60% of patients hospitalized in surgical departments for acute cholecystitis will be at high operational risk due to concomitant diseases (cardiovascular disease, chronic lung disease, chronic kidney disease or hypothyroidism, etc.) [5, 6]. Laparoscopic interventions are contraindicated for these patients, due to the fact that this technique involves the use of endotracheal anesthesia, mechanical ventilation, tensioncarboxypneumoperitoneum, the use of electric current for hemostasis and treatment of the gallbladder bed. Elderly patients with subcompensated concomitant pathology are also undesirable “open” cholecystectomy. In this connection, most often in this category of patients, operations draining the gallbladder are used [7]. The essence of gallbladder draining operations is as follows: to level gallbladder hypertension, thereby creating conditions for reducing edema, restoring normal blood circulation in the gallbladder wall, and ultimately stopping an attack of acute cholecystitis. Currently, in patients with a high operational and anesthetic risk, ultrasound (US) guided percutaneous transhepaticcholecystostomy (PTCS) is most often used, this method has a number of advantages: general anesthesia is not required, speed and ease of implementation, the ability to perform even with complicated forms of acute cholecystitis[8, 9].

According to various studies, PTCS under US, in addition to expectant management, is the only method that prevents serious complications of acute cholecystitis, including empyema, gangrene, perforation or sepsis [10, 11]. It has also recently been suggested that, in some cases, PTCS may provide definitive and safe treatment [12, 13]. For many patients, this serves as a bridge to two-stage surgery [14, 15]. Our work is devoted to a two-stage surgical intervention.

Purpose of study is analysis of the effectiveness of PTCS in AOC and subsequent LCE.

Material and methods

We retrospectively analyzed the clinical data of 64 patients treated with AOC during 2017 to 2021 at the A.N. Syzganov National Scientific Center of Surgery. AOC was diagnosed based on complaints, clinical and laboratory-instrumental (full blood count, urinalysis, biochemical blood test, fibrogastroduodenoscopy, US of abdomen) examination. After the diagnosis of AOC was established, the patients underwent PTCS or LCE (Fig. 1). The mean age of all patients was 58.7±13.0 years (23-95). There were 30 men (46.8%) and 34 women (53.2%).

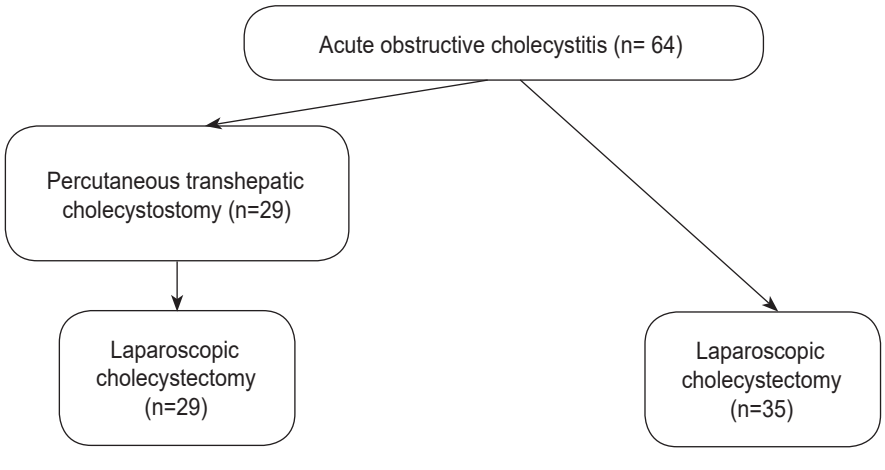

Figure 1.
Study design

Depending on the type of surgical treatment, patients with AOC, were divided into two groups:

1. The first group: patients who underwent PTCS at the first stage (n=29), at the second stage, LCE was performed after 10 days. In this group, the average age was 65.3±9.0 years (43 - 95).

The indication for PTCS was an acute inflamed gallbladder and a high risk of intra- and postoperative complications.

Inclusion Criteria:

- strained gallbladder (according to US)
- the wall of the gallbladder is more than 5 mm. (according to US)

Exclusion Criteria:

- chronic calculouscholecystitis
- ascites (presence of free fluid in the abdomen)
- gallbladder wall less than 5 mm.

According to the timing of the operation, these patients were divided into three subgroups: A, B and C. In patients of subgroup A, LCE was performed within 10 days (mean 5.3 ± 2.4 days (mean 3-9 days) after PTCS (n=3), in patients of subgroup B, LCE was performed from 2 weeks to 4 weeks (mean 20.1 ± 3.8 days) after PTCS (n=12), in patients of subgroup C, LCE performed after more than 4 weeks (mean 51.2 ± 13.9 days (29 days - 72 days)) after PTCS (n=14).

In subgroup A, the mean age was 83±8 years. In this group, men accounted for 1 patient (33.3%), women accounted for 2 patients (66.7%). In subgroup B, the mean age was 63.5 ± 9.7 years (43 years - 85 years). In this subgroup, men accounted for 41.6% (5 patients), women 58.4% (7 patients). In subgroup C, the mean age was 63 ± 6.5 years (48 years - 77 years). In this group, 6 patients (42.8%) were males and 8 patients (57.2%) were females.

All patients of the first group, PTCS was placed on the first day of hospitalization, due to pain, high feverand according to the US picture of AOC (Figure 2, 3). Subsequently, these patients (45.3%) underwent LCE.

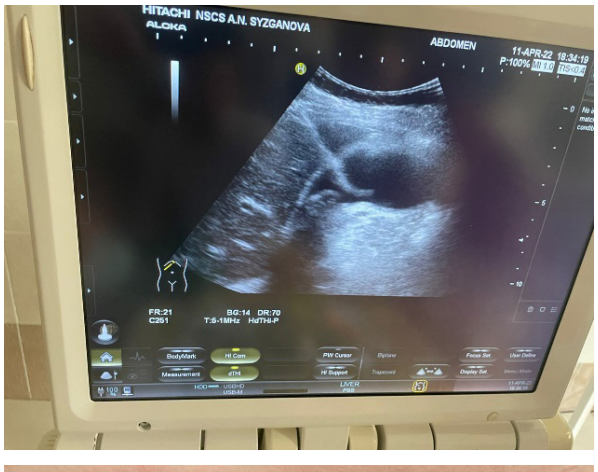

Figure 2.
Puncture and placement of percutaneous transhepatic cholecystostomy under ultrasound guidance

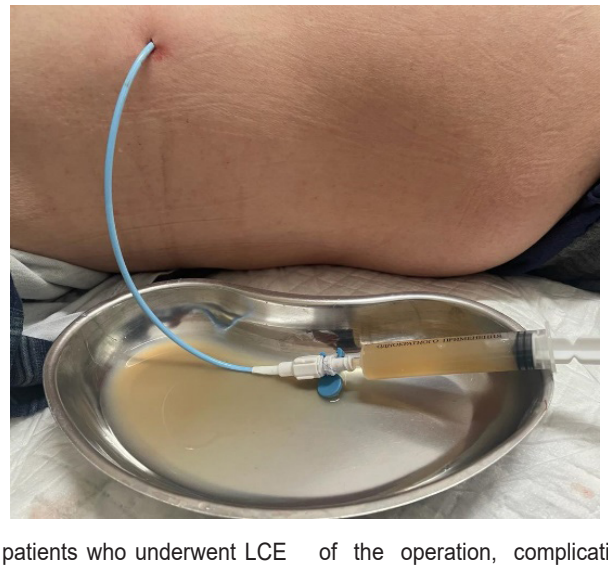

Figure 3.
After insertion of the drain into the gallbladder cavity

The second group: patients who underwent LCE (n=35). The mean age in this group was 53.4 ± 15.4 years. In the second group of 35 patients, there were 16 men (45.7%), 19 women (54.3%).

We divided all patients with AOC into two groups to compare the types of surgical treatment. The clinical results of patients in both groups were analyzed during the follow-up period. We studied the duration of the operation, complications, conversions and postoperative bed days using data processing in Microsoft Excel, GraphPad.

Results

In our observations in all patients, we obtained the following results:conversion to laparotomy was in 10 (15.6%) cases, in one (1.5%) case, the choledochal wall was injured intraoperatively. Postoperative

complications were observed in 3 (4.6%) cases, postoperative bed-days averaged 5.25 ± 1.2 days.

After PTCS in all patients of the first group, the body temperature returned to normal, pain in the right hypochondrium was stopped.

Control studies showed the subsidence of acute inflammation, the disappearance of intoxication. On the control US, regression of echographic signs of gallbladder destruction was observed. Subsequently, LCE was performed with a waiting period of 3 days to 72 days, on average 33.6 ± 17.5 days.

Table 1.
Depending on the method of surgical treatment performed - PTCS and LCE, the following improvements were obtained in each group: postoperative hospital stay and conversion

	Cholecystostomy + LCE	LCE	P-value
	(n=29)	(n=35)	
	mean±st. deviation (min.-max.)	mean±st. deviation (min.-max.)	
Age	65.3 ± 9.0 (43-95)	53.4 ± 15.4 (23-81)	p>0.05
Gender (m/f)	(12/17)	(16/19)	ns
Body temperature	37.2 ± 0.4 (36-39.5)	37.2 ± 0.5 (36.1-38.5)	ns
Laboratory data			
Bilirubin	25.08 ± 12.9 (93.5 - 4.6)	18.5 ± 9.4 (70.3 - 3.4)	ns
Leukocytes	9.3 ± 3.2 (16-3)	9.2 ± 3.3 (19-3)	ns
Amylase	42.1 ± 15.7 (112 - 15)	50.5 ± 18.5 (128.9 - 21)	ns
Concomitant disease			
Respiratory system	2	-	ns
The cardiovascular system	16	16	ns
Diabetes mellitus	2	2	ns
Intraoperative and postoperative data			
Duration of operations	108.1±30.5 (60-180)	117.9±39.9 (60-320)	ns
Conversion	1	9	p<0,05
Complications	0	6	p<0,05
Hospital stay	4.4 ± 0.8 (3 - 10)	6.1 ± 1.6 (2 - 20)	p<0,05

In the first group, the average age was 65.3 years (43-95), the average age in the second group was 53.4 years (23-81). A statistical difference was found. In the first group, patients are comparatively older by 18.3% than patients in the second group (p=0.05).

The duration of the operation in the first group averaged 108.1 min ± 30.5 (60-180 min), the duration of the operation in the second group averaged 117.9 min ± 39.9 (60-320 min). When compared, no statistical difference was found.

The average leukocytes in patients of the first group during hospitalization were 9.3±3.2x10^9/l. (3-16x10^9/l), 3-5 days after cholecystostomy was 6.8±1.6x10^9/l (3-12 x10^9/l)). Similarly, in patients of the second group, the average leukocyte count during hospitalization was 9.2±3.3x10^9/L (3–19x10^9/l), on days 3-5 8.6±1.8x10^9/l (4–17x10^9/l). When compared, no statistical difference was found.

In the first group of patients, at the second stage of treatment, when attempting LCE, in 1 (3.4%) case, conversion to laparotomy was performed due to a massive adhesive process. Comparatively, in the second group, conversion was performed in 9 (25.7%) cases due to an acute inflammatory process. Frequency conversion was higher in patients of the second group by 90% (p=0.05).

In the postoperative period, no increase in body temperature was observed in the first group; in the second group,21 (60%) patients experienced an increase in temperature up to 38C.

There were no complications during the operation in the first group of patients. In the second group, intraoperative complications were observed in 6 (17.1%) cases. In one (2.8%) case, the choledochal wall was injured intraoperatively, laparoscopic suturing of the choledochal wall was performed with removal of Pikovsky drainage. In the postoperative period, after LCE, in 5 (14.2%) cases, there were complications: bleeding in 4 (11.4%) cases and suppuration of the postoperative wound in 1 (2.8%) case. 4 patients with postoperative bleeding had the intake of hemorrhagic nature of the discharge through the control drainage and a decrease in red blood cells, relaparoscopy was performed, the source of bleeding was the gallbladder bed. Hemostasis was achieved with the help of additional coagulation of bleeding sites, the operation was completed by drainage of the subhepatic space. There was no recurrence of bleeding in any case. When comparing the number of postoperative complications a statistically significant difference was found.

Postoperative hospital stay in the first group averaged 4±0.8 days and in the second group it averaged 6±1.6 days. Statistical difference was found. Postoperative hospital stay in patients of the second group were 38.6% higher than in patients of the first group.

Table 2.
Distribution of patients of the first group according to the terms of the operation: LCE after PTCS

	Cholecystostomy + LCE			P-value
	Group A Within 10 days **(n=3)**	**Group B** From 14 days to 28 days **(n=12)**	**Group C** More than 28 days **(n=14)**	
	M±m (min.-max.)	M±m (min.-max.)	M±m (min.-max.)	
Conversion	0	1	0	ns
Duration of operation	105 ± 36.6 min (160-65)	109.5 ± 32.0 min (180-60)	113.9 ± 29.4 min (180-60)	ns
Complications	0	0	0	ns

Depending on the interval of LCE after PTCS in subgroup B, in 1 (8.3%) case, when attempting LCE, conversion to laparotomy was performed due to massive adhesions. The duration of the operation in subgroup A averaged 105 ± 36.6 min (65-160 min), the duration of the operation in the subgroup averaged 109.5 ± 32.0 min (60-180 min), in subgroup C the average duration of the operation was 113 .9 ± 29.4 min (60–180 min). No complications were observed in all subgroups (Table 2).

Discussion

AOC is a common disease with a frequency of 1-3% per year in patients with gallstones (10-20%) [16, 17]. Acute cholecystitis carries a risk of complications, including empyema, gangrene, perforation, and peritonitis. In addition, morbidity and mortality associated with emergency cholecystectomy in critically ill patients: 55-66% and 14-30%, respectively [18].

PTCS is the operation of choice for AOC, in critically ill, aged patients and in patients with concomitant pathologies. The technical success rate of PTCS can be very high in experienced hands, with reported rates of 95-100% [19].

Indications for the use of PTCS for the treatment of acute cholecystitis vary across centers but generally include patients at high surgical risk who have a comorbid condition with severe acute cholecystitis. The latest published guideline “Tokyo Guidelines” mentions moderate acute cholecystitis is also an indication [20, 21], due to a disease duration of more than 72 hours, the latter of which is likely due to severe inflammation and tight adhesions and therefore a higher risk of conversion and cholecystectomy complications [22, 23].

PTCS is performed to decompress the gallbladder in AOC. Consistently, as a result of drainage, a decrease in pain syndrome is observed against the background of regression of the inflammatory process. Comparatively in patients according to statistical data, after surgical treatment, against the background of inflammation of the gallbladder, there are more complications compared to patients who underwent preliminary drainage of the gallbladder [24].

The use of the technique of two-stage treatment of AOC, using US-guided PTCS as the first stage, significantly reduced the incidence of intraoperative and postoperative complications. Most significantly managed to reduce the number of conversion, purulent-inflammatory complications. This pattern finds a quite obvious explanation: in fact, LCE is performed under conditions of subsided inflammation and after appropriate preparation of the patient, i.e. in the so-called “cold” period [8, 9].

Our study shows that in AOC, the use of two-stage treatment (PTCS, LCE) significantly reduces the number of conversions to open surgery, reduces postoperative complications and the number of hospital stay in the postoperative period ($p<0.05$).

Table 3.
Data literature on percutaneous transhepatic cholecystostomy followed by cholecystectomy

Years	Authors	Study design	Database	Comparison	Results
2009	Kim et al. [25]	Retrospective	Single medical center	≤7 days (n=35) vs 14-39 days (n = 38)	In a group ≤ 7 days total hospital stay was shorter
2015	Jung et al. [26]	Retrospective	Single medical center	≤10 days (n = 30) vs. >10 days (n = 44)	There were no differences between operative time, postoperative hospital stay, conversion to open cholecystectomy, or post-operative complications.
2019	Altieri et al. [27]	Retrospective	New York State SPARCS Database	≤ 8 weeks (n = 1211) vs > 8 weeks (n=1787)	≤ The 8 weeks group had a higher complication rate and longer stay

SPARCS - A nationwide system for planning and collaborating in research.

The optimal timing of intermittent cholecystectomy remains one of the major concerns in LCE patients with PTCS. Kim's studies looked at the impact of the timing of LCE as a second step after PTCS and not earlier than 14 days, this reduces conversion and complication rates, but increases hospital stay, and patients suffer the inconvenience associated with a cholecystostomy tube [25]. Jung et al. in their studies reported that the most common complication after PTCS was catheter-related (displaced catheter), and therefore it was suggested that LCE was preferable within 10 days after PTCS [26]. Altieri et al.in studies by the patient after PTCS, expected LCE at intervals greater than 8 weeks (Table 3) [27]. The results of our study show, which is the optimal interval between PTCS and LCE is more than 4 weeks. LCE, which was performed up to 4 weeks, led to difficulties due to the preserved inflammatory process of the gallbladder and around the gallbladder.

Conclusions

The use of two-stage treatment significantly reduces the conversion to open surgery, significantly reduces postoperative complications and hospital stay in the postoperative period. According to the results of our research, the best interval between PTBD and LCE is over 4 weeks.

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CLINICAL CASE OF SIMULTANEOUS RADICAL TREATMENT OF TETRALOGY OF FALLOT WITH MAJOR AORTOPULMONARY COLLATERAL ARTERIES

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Conflict of interest
The authors declare that they have no conflicts of interest

Keywords:
Tetralogy of Fallot, major aortopulmonary collateral arteries, clinical case, congenital heart disease, heart surgery

Abstract

Tetralogy of Fallot (TOF) combined with major aortopulmonary collateral arteries (MAPCA) is a severe congenital heart defect due to the combination of a triad of cardiac malformation withan additional vascular anomaly of the small circulatory system. To date, there is no single accepted standard in which sequence and according to which criteria radical surgical correction of combined anomalies is indicated. This paper describes a clinical case of simultaneous opentreatment of TOF and endovascular occlusion of the MAPCA in an 8-month old child. Based on the evidence base of a large study, our patient belonged to the group where after TOF correction the therapeutic way of MAPCA treatment was used at first, which was ineffective in 38% and led to surgical methods of MAPCA occlusion. Choosing the way of simultaneous simultaneous surgical treatment of two pathologies allowed us to minimize postoperative risks and achieve good clinical results.

Үлкен қолқа-өкпе коллатералдары бар Фалло тетрадасын симуляцияланған радикалды емдеуді жүргізудің клиникалық жағдайы

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Аңдатпа

Фалло тетрадасы (ФТ) үлкен қолқа-өкпе коллатералдарымен біріктірілген жүрек ақауының триадасының кіші қанайналымы шеңберінің қосымша тамырлы ауытқуымен үйлесуіне байланысты ауыр туа біткен жүрек ақауы болып табылады. Бүгінгі күні біріктірілген ауытқуларды радикалды хирургиялық түзету қандай реттілікпен және қандай критерийлер бойынша орындалатыны туралы көрсетілген бірыңғай қабылданған стандарт жоқ. Бұл жұмыста 8 айлық балаға ФТ және эндоваскулярлық сәулелік окклюзияны ашық әдіспен бір мезгілде емдеудің клиникалық жағдайы сипатталған. Үлкен зерттеудің дәлелді базасына сүйене отырып, біздің науқас ФТ түзетілгеннен кейін алдымен сәулелерді емдеудің терапиялық жолы қолданылған топқа кірді, оның 38%-ы тиімсіз болып шықты, бұл сәулелерді окклюзиялаудың хирургиялық әдістеріне жүгінуге әкелді. Бірден екі патологияны симуляциялық хирургиялық емдеу жолын таңдау бізге операциядан кейінгі қауіп-қатерлерді азайтуға және оңтайлы клиникалық нәтижеге қолжеткізуге мүмкіндік берді.

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Түйін сөздер:
Фалло тетрадасы, үлкен аорто-өкпе коллатералдары, клиникалық жағдай, туа біткен жүрек ақауы, жүрек операциясы.

Клинический случай проведения симультанного радикального лечения тетрады Фалло с большими аорто-лёгочными коллатералями

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Конфликт интересов
Авторы заявляют об отсутствииконфликта интересов

Ключевые слова:
тетрада Фалло, большие аорто-лёгочные коллатерали, клинический случай, врожденный порок сердца, операция на сердце

Аннотация

Тетрада Фалло (ТФ) в сочетании с большими аорто-легочными коллатералями (МАРСА) представляет собой тяжелый врожденным порок сердца, обусловленный сочетанием триады кардиального порока с дополнительной сосудистой аномалией малого круга кровообращения. На сегодняшний день не существует единого принятого стандарта в какой последовательности и по каким критериям показана радикальная хирургическая коррекция сочетанных аномалий. В настоящей работе представлено описание клинического случая одновременного лечения открытым способом ТФ и эндоваскулярной окклюзии БАЛК ребёнку 8 месяцев. Основываясь на доказательной базе крупного исследования, наш пациент входил в группу где после коррекции ТФ сначала применялся терапевтический путь лечения БАЛК, в 38% который оказывался неэффективным что приводило прибегать к хирургическим методам окклюзии БАЛК. Выбрав путь симультанного хирургического лечения сразу двух патологий, позволило нам минимизировать послеоперационные риски и добиться хорошего клинического результата.

Introduction

Tetralogy of Fallot (TOF) combined with major aortopulmonary collateral arteries (MAPCA) is a severe congenital heart disease aggravated by additional volume of cross over blood flow from the large to small circulatory system. There is no special standard for transcatheter occlusion of collaterals, there are no clear algorithms of surgical tactics, and therefore the surgeon faces the task of determining the indications and times tages of correction of combined TOF and MAPCA pathology. To determine the hemodynamic significance of MAPCA, and thus indicate the need for their one-stage closure, an attempt was made in The Second Xiangya Hospital of China on 380 patients operated on over a 10-year period [1]. These patients accounted for 28.1% of all operated TOF (1351 cases), of which MAPCA occlusion was performed in 4.8% of cases. A mathematical formula for the MAPCA occlusion index was derived, where $K=((\sum R^2)/Wt)$, R is MAPCA diameter and Wt is patient weight. With $K\geq2$, collateral occlusion and surgical correction are recommended to be performed simultaneously, with $1< K< 2$, the need forcollateral occlusion depends on the postoperative condition of patients with more than the standard increase in artificial pulmonary ventilation (APV) time for this pathology. In this group, the need for MAPCA occlusion was 38%.

During radical TOF correction, if hemodynamically significant MAPCA are not closed, severe congestion in the small circle of the circulation and bypass of the great circle of thecirculation are expected in the postoperative period [2]. In such situations, a longer period of ventilatory ventilation is required and many patients have complications such as low cardiac output syndrome, pulmonary edema, lung infection and pleural effusion. The tandem approach, in which endovascular MAPCA occlusion immediately after radical open surgery is the second stage, effectively solves this problem [3].

Case study

A child 8 months old, 7 kg was admitted to the clinic on 09/28/2022 with diagnosis: TOF, PFO, PDA, MAPCA with complaints of shortness of breath, lividity of the skin, rapid fatigue during feeding. The basic diagnostic tests: ECG, echocardiography (ECHO) were performed. Instead of contrast computed tomography (CT), cardiac catheterization (CC) was performed. The defect was confirmed by ECHO data: Aorta: 1.4 cm, bulbus shifted to the right by 50%. MAPCA of 0.3 cm was not excluded. Pulmonary artery (PA): valve 0.55 cm; flaps compacted, trunk 0.6 cm. The branches of the pulmonary artery are 0.6 cm each. The gradient on the PA valve was 76/45 mmHg. Degree 0-1 regurgitation. Interventricular septum: subaortic defect 1.1 cm. Interatrial septum: PFO 0.15cm. Cardiac cavities: right sections moderately dilated, Myocardial contractility: satisfactory. To clarify cardiac anatomy and extracardiac vascular structures, the following was performed: CC from the right ventricle (RV)- the aorticarch with the PA trunk and branches was contrasted simultaneously, the RV cavity increased in volume, moderate hypoplasia of the PA trunk and valve ring, moderate kinking of the left PA branch mouth, the middle and distal segments of PA branches were developed satisfactorily (Fig. 1). There was marked tubular stenosis in the exiting RV. In thoracic aortography, there is contrasting hypervascularization zones of both lungs across all fields, due to the presence of a developed MAPCA - bronchial and intercostal arteries branching off in the projection Th 2-3 of the thoracic spine, with adiameter of MAPCA afferent arteries of 1.5-3.0 mm (Fig. 2). Tonometry in mm Hg: PA trunk 30/5, middle 13, PJ75/3, distal segment of right and left branches of PA 24/7 (middle 12). The diameter of the distal segments of the PA right 6.4 mm (Z score 0.03), left 7.6 mm (Z score1.69) PA trunk 7.3mm (Z score-2.12) (Fig.3), PA valvering 5.5 mm, aorta valvering 13.8 mm, at diaphragm level 6.1 mm.

Diagnosis

TOF, subclavian stenosis with moderate hypoplasia of the valvering and PA trunk. Developed MAPCA network on both sides.

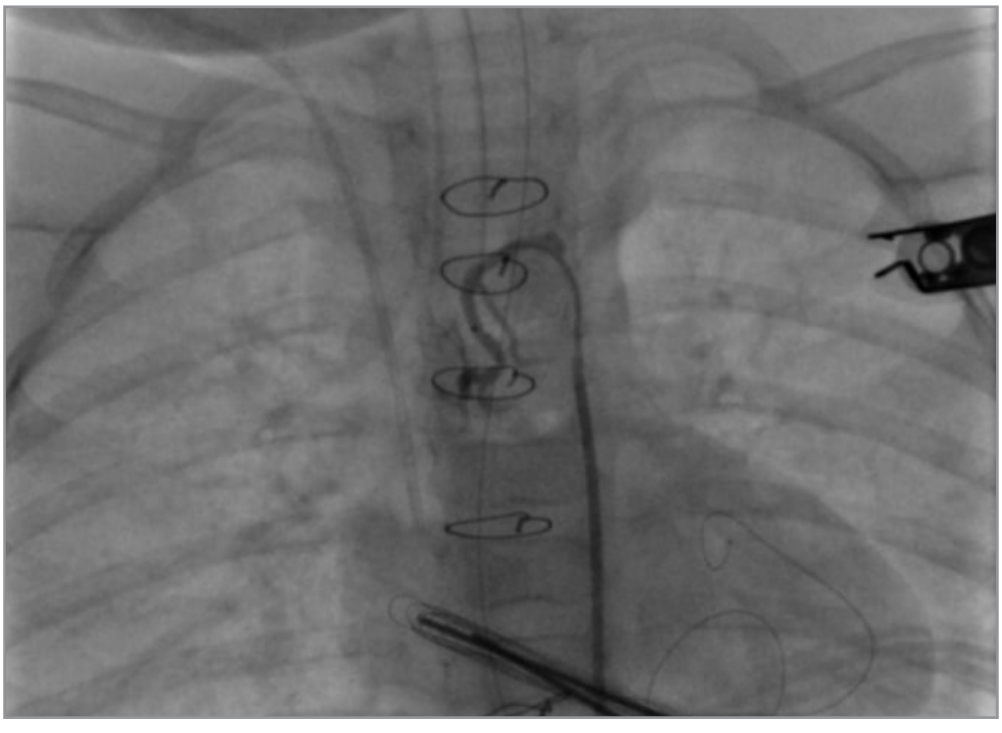


Figure 1.
Angiogram. Enlarged and hypertrophied right ventricle, exit section with marked tubular stenosis, hypoplasia of the pulmonary artery trunk and valvering, satisfactorily developed pulmonary artery branches

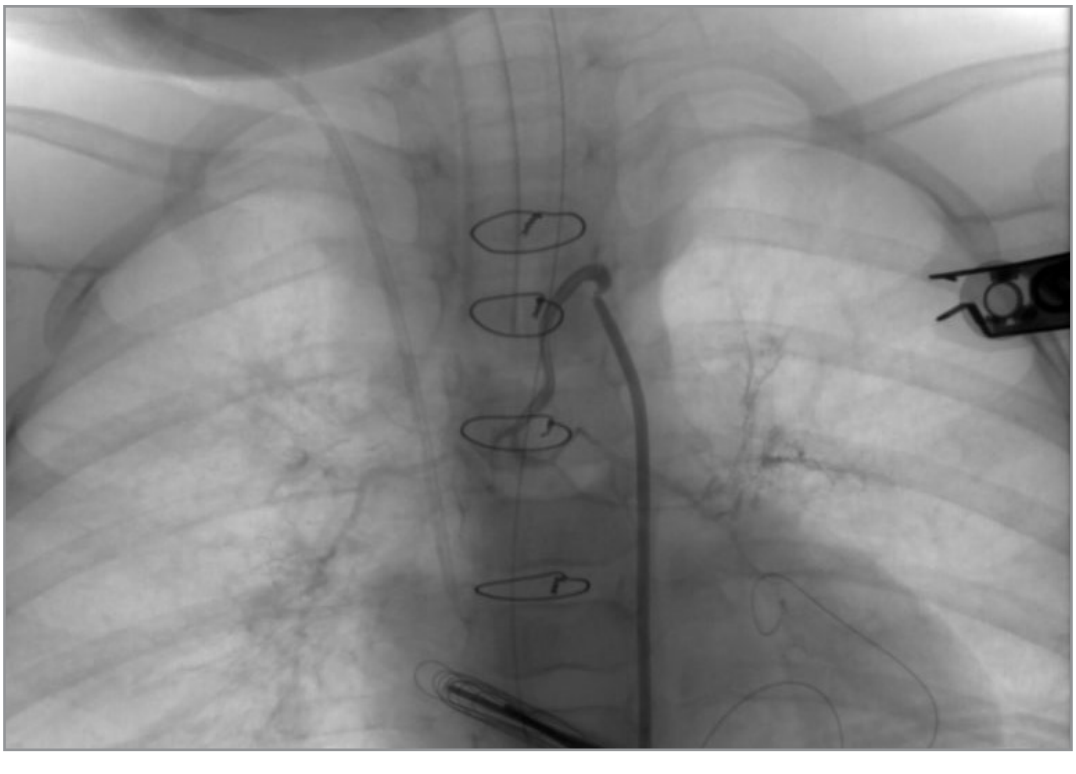


Figure 2.
Angiogram. MAPC - bronchial branch originating from the arch B of the aortic segment with a diameter of 3.0 mm

Figure 3.
Z score of the pulmonary artery branches and trunk by cardiac cavity probing

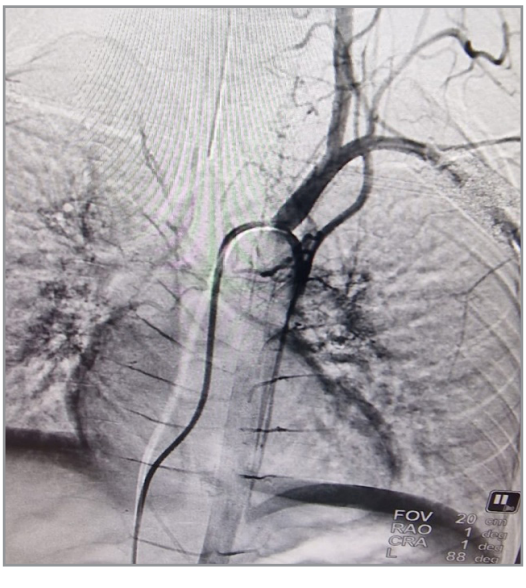
Height (cm): 68
Weight (kg): 7
BSA formula: DuBois 0.35 M^2

Site	Measured (cm)	Mean	Range	Z-Score
RVD:		1.21	(0.81 - 1.80)	
IVSd:		0.41	(0.29 - 0.59)	
IVSs:		0.57	(0.42 - 0.77)	
LVIDd:		2.39	(2.02 - 2.81)	
LVIDs:		1.48	(1.20 - 1.82)	
LVPWd:		0.34	(0.25 - 0.47)	
LVPWs:		0.66	(0.51 - 0.84)	
Aortic Annulus:		0.88	(0.74 - 1.03)	
Sinuses:		1.22	(1.02 - 1.46)	
ST Junction:		0.97	(0.77 - 1.20)	
Transverse Arch:		0.99	(0.77 - 1.28)	
Isthmus:		0.69	(0.53 - 0.91)	
Distal Arch:		0.74	(0.56 - 0.96)	
Ao at Diaphragm:		0.71	(0.57 - 0.88)	
Pulmonary Annulus:	0,73	1.01	(0.78 - 1.29)	-2.12
MPA:		1.05	(0.81 - 1.36)	
RPA:	0,64	0.64	(0.49 - 0.84)	0.03
LPA:	0,76	0.57	(0.43 - 0.75)	1.69
Mitral Annulus:		1.48	(1.16 - 1.90)	
Tricuspid Annulus:		1.61	(1.18 - 2.20)	
Left Atrium:		1.45	(1.15 - 1.83)	

Update reset

On 11.10.2022 we performed elective surgical correction under the conditions of cardiopulmonary bypass: VSD repair with anautopericardial patch, in fundibulotomy, PA valve commissurotomy with valve and PA fibrous ring preservation, RV outlet plasty with anautopericardial patch, PFO suturing. After the operation the child was immediately taken from the cardiac surgery room to the Cath-Lab operating room. Course of intervention: retrograde puncture and catheterization of the right common femoral artery by Seldinger. A JR 3.5 4Fr type catheter was and placed on the aortic arch, and thoracic aortography was performed, in which contrasting zones of hypervascularization of both lungs were noted throughout the fields, due to the presence of a developed 3 mm diameter MAPCA system (Figure 4). The source of MAPCA was a bronchial branch originating from the aorticarch. Given the angiographic findings, MAPCA embolization was recommended. A BS Renegade microcatheter was installed at the kostium of the pathological branch, and embolization with BS Contour 45-150μM pVa particles - 1 vial was performed. At the control angiography the contrast intensity was reduced by 100% (Fig. 5). There were no complications during the operation.

Figure 4.
Angiogram. Catheter inserted into MAPCA, thoracic aortography with contrasting areas of hypervascularization of both lungs across all fields



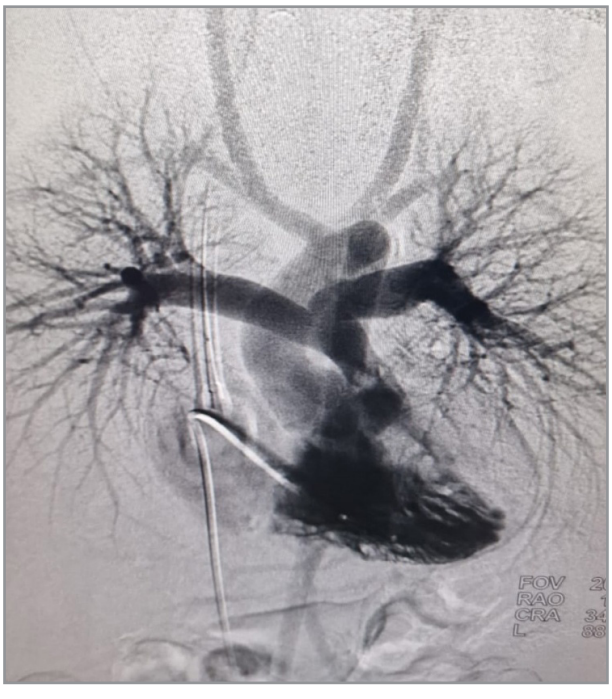


Figure 5.
Angiogram. End result after MAPCA embolization: at control angiography, the contrast intensity of pulmonary vascularization was reduced by 100%

Control postoperative ECHO: tricuspid valve 1st degree regurgitation. Mitral valve: 0-1 degree regurgitation. Aorta: 0-1 degree regurgitation. Abdominal aorta: main blood flow. Pressure gradient on the PA valve: 10/5 mmHg, regurgitation 0-1 degree. Left ventricular ejection fraction 64%. Interventricular septum: patch, shunt 1 mm. Atrial septum: tightly sutured. The child was extubated 44 hours after the simultaneous surgeries, on the 6th postoperative day he was transferred to the specialized department and discharged on the10th day.

Discussion

MAPCA is one of the significant factors influencing the final outcome of radical TOF correction [4]. At the early stage, cardiac surgeons did not know much about collaterals and did not treat them when performing radical TOF correction. With the development of medical and computed tomography technologies, cardiac surgeons gradually deepened their knowledge of aortopulmonary collaterals and their treatment became an important part of radical TOF correction [5].

It is logical to try to close all available additional collaterals in open surgery in one step after cardiac TOF correction, but technical difficulties in the form of collateral search, expansion of the operating field and surgery time, in most cases the inability to close all sources of additional blood supply, have led to the development of a staged approach of radical treatment involving interventional technologies. Endovascular techniques have a number of advantages over hard-to-reach surgical areas and are used both before, during, and after open surgery [6].

At the current stage, when the task is to perform simultaneous cardiovascular surgical interventions, a universal hybrid operating room [7], which allows performing open and closed surgery simultaneously, is deployed on the basis of highly specialized clinics. A tour center, we were able to minimize the time factor between the first and second stages of TOF radical correction with MAPCA, thanks to the functional location of two closely situated multi-targetoperating theatres on one floor of the surgical unit. Most studies on MAPCA treatment have focused on MAPCA occlusion before TOF correction, but MAPCA occlusion before surgical correction could lead to a further decrease in saturation, and therefore the patient required surgical correction immediately after transcatheter closure of MAPCA.

To reduce morbidity and mortality, endovascular MAPCA occlusion or surgical ligation should be performed in patients with a collateral diameter to body weight ratio of at least 0.5 mm/kg. In patients with values of approximately 0.2 to 0.5mm/kg, prolongation of APV should have priority over transcatheter occlusion, and for patients with values below 0.2 mm/kg no additional treatment is required [8]. In our child's case, this value left 3.5 in the presence of 3.0 mm collaterals. We prioritized the closure of collaterals immediately after TOF correction with the desire not to prolong APV, which would have increased the risks of APV-associated complications.

Conclusion

In our clinical case based on the experience of the world leading clinics, the principle of simultaneous treatment of severe combined pathology of Tetralogy of Fallot with major aortopulmonary collateral arteries was successfully applied. Taking into account the evidence base, our patient belonged to the intermediate group, where single-stage correction of TOF with MAPCA occlusion was performed in 38% of cases. During radical open correction of TOF, the valve complex of the PA trunk was preserved and MAPCA was embolized immediately within several minutes after the first operation, which allowed to minimize postoperative risks and achieve a good clinical result.

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POSSIBILITIES OF MINIMALLY INVASIVE METHODS OF DIAGNOSIS AND TREATMENT FOR CLOSED ABDOMINAL INJURIES

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Abstract

In this article, the study of the diagnostic effectiveness of ultrasound examination (ultrasound) in identifying signs of damage to the abdominal organs and a detailed description of the ultrasound semiotics of closed abdominal trauma (CAT).

Purpose. *The study of the diagnostic effectiveness of sonography in identifying signs of damage to the abdominal cavity organs and a detailed description of the ultrasound semiotics of CAT.*

Material and methods. *Ultrasound was performed in 160 patients with blunt abdominal trauma as an initial method for diagnosing intra-abdominal injuries and was performed in the emergency department immediately upon admission to the clinic.*

Conclusion. *Among the diverse sonographic semiotics of intraperitoneal injuries in CAT, the presence of various volumes of free fluid in the abdominal cavity is the most constant ultrasound signs. The developed method of ultrasound assessment of the volume of free fluid in the abdominal cavity, based on taking into account the thickness of the fluid layer and its prevalence in the abdominal cavity zones, does not complicate or lengthen the FAST protocol procedure, allows to determine the critical volumes of hemoperitoneum, which are crucial in choosing the tactics of surgical treatment of CAT.*

Conflict of interest
The authors declare that they have no conflicts of interest

Keywords:
closed abdominal trauma, ultrasound, laparoscopy

Жабық абдоминальды жарақаттарды анықтау және емдеудің аз инвазивті әдістері

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Аңдатпа

Бұл мақалада біз құрсақ қуысы мүшелерінің зақымдану белгілерін анықтаудағы ультрадыбыстық зерттеудің (УДЗ) диагностикалық тиімділігін және іштің жабық жарақатының (ІЖЖ) ультрадыбыстық семиотикасының толық сипаттамасын зерттедік.

Мақсаты. *Құрсақ қуысы мүшелерінің зақымдану белгілерін анықтауда сонографияның диагностикалық тиімділігін зерттеу және ІЖЖ ультрадыбыстық семиотикасының егжей-тегжейлі сипаттамасы.*

Материал және әдістер. *Құрсақішілік жарақаттарды диагностикалаудың бастапқы әдісі ретінде құрсақ қуысының доғалы жарақаты бар 160 науқасқа емханаға түскеннен кейін бірден жедел жәрдем бөлімінде ультрадыбыстық зерттеу жүргізілді.*

Қорытынды. *Құрсақ қуысындағы бос сұйықтықтың көлемін ультрадыбыстық бағалаудың әзірленген әдісі, сұйықтық қабатының қалыңдығына және оның құрсақ қуысы аймақтарында таралуына негізделген, FAST хаттамасының процедурасын қиындатпайды немесе ұзартпайды және мүмкіндік береді. Қуық асты безінің қатерлі ісігін хирургиялық емдеу тактикасын таңдауда шешуші маңызы бар гемоперитонеумның критикалық көлемін анықтау.*

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Түйін сөздер:
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Миниинвазивные методы диагностики и лечения при закрытых травмах живота

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Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Аннотация

В данной статье изучены диагностической эффективности ультразвукового исследования (УЗИ) в выявлении признаков повреждения органов брюшной полости и подробному описанию ультразвуковой семиотики закрытой травмы живота (ЗТЖ).

Цель. *Изучение диагностической эффективности сонографии в выявлении признаков поражения органов брюшной полости и подробное описание ультразвуковой семиотики ЗЖТ.*

Материал и методы. *УЗИ выполнено 160 больным с ЗТЖ в качестве инициального метода диагностики внутрибрюшных повреждений и выполнялось в при поступлении пациента в клинику.*

Заключение. *Среди разнообразной сонографической семиотики внутрибрюшных повреждений при ЗТЖ наиболее постоянным УЗ-признаков является наличие различного объема свободной жидкости в брюшной полости. Разработанный метод ультразвуковой оценки объема свободной жидкости в брюшной полости, основанная на учете толщины слоя жидкости и ее распространенности в зонах брюшной полости, не усложняет и не удлиняет процедуру FAST-протокола, позволяет определить критические объемы гемоперитонеума, имеющие решающее значение в выборе тактики хирургического лечения ЗТЖ.*

Ключевые слова:
закрытая травма живота, ультразвуковое исследования, лапароскопия

Introduction

In choosing the tactics of surgical treatment of blunt abdominal trauma (BAT), the quantitative assessment of the volume of outflowing blood and ultrasound identification of the severity of injury to the internal organs of the abdominal cavity, mainly parenchymal organs, are of no small importance. Today, in emergency surgery of abdominal injuries, the initial methods of instrumental examination of the abdominal organs is ultrasound, which is aimed at improving the quality of care for victims by early detection of injuries, especially when these conditions are potentially life-threatening, and the outcome of surgical treatment depends on the time of its initiation. Given the importance of ultrasonography in diagnosing intra-abdominal complications of trauma and in performing a wide range of minimally invasive sonographically guided diagnostic and treatment procedures in a variety of emergencies, the American College of Surgeons has included in its expanded training protocol for emergency medicine physicians the use of the FAST protocol in providing care for patients with trauma (Advanced Trauma Life Support – ATLS) [1]. Moreover, the Agency for Healthcare Research and Quality (AHRQ) has included ultrasound-guided central venous catheterization in its clinical guidelines to increase the safety of the procedure [2]. Similarly, the American Society of Echocardiography (ASE), in collaboration with the American College of Emergency Physicians (ACEP), has developed a focused cardiac ultrasound (FOCUS) protocol for emergencies [3]. Protocols for the examination of organs that are traditionally considered poorly amenable to sonographic imaging (lungs, pancreas) are being actively developed.

Purpose

The study of the diagnostic effectiveness of sonography in identifying signs of damage to the abdominal cavity organs and a detailed description of the ultrasound semiotics of BAT.

Material and methods

Ultrasound was performed in 160 patients with blunt abdominal trauma as an initial method for diagnosing intra-abdominal injuries and was performed in the emergency department immediately upon admission to the clinic. In 26 (16.3%) cases, ultrasound was performed in dynamics. The main inclusion criteria for patients in the study were age 18 and older, as well as stable hemodynamic parameters (BP ≥ 90 mm Hg) at the time of the start of surgery.

Transabdominal ultrasound was performed using the Mindray DC-40 device (China) using a 3.5 MHz convex probe and 5 MHz and 7.5 MHz linear probes without prior patient preparation.

In order to assess the significance of various values of hemoperitoneum volume (<300 ml, 300-500 ml and >500 ml) in patients with BAT with stable hemodynamic parameters, the values of their relative risk (RR) were calculated in prediction of severe intra-abdominal complications of trauma. At the same time, the degree of statistically significant association of these 3 ranges of hemoperitoneum volume with the probability of detecting severe intra-abdominal injuries were ranked as: doubtful (RR=0-1.0); probable (RR=1.0-3.0); absolute (RR>3.0).

Results and discussion

Our observations show that in patients with BAT, the sensitivity (Se), specificity (Sp) and accuracy (Ac) of ultrasound in detecting one of the main signs of injury - free fluid (hemoperitoneum) in the abdominal cavity - is, respectively, 88.3, 87 .8 and 88.1% (Table 1), which by modern standards is not considered a sufficiently high figure.

Ultrasound sign	TP	FP	TN	FN	Se	Sp	Ac	VPV	NPV
Free liquid	98	6	43	13	88,3%	87,8%	88,1%	94,2%	76,8%

Table 1.
Informativeness of ultrasound in detecting signs of BAT, n=160

Note: TP - true positive results, FP - false positive results, TN - true negative results, FN - false negative results, Se - sensitivity (sensitivity), Sp - specificity (specificity), Ac - accuracy (test accuracy), VPV - predictive value of a positive result (positive predictive value), NPV - negative predictive value.

However, sonographic signs of free fluid in the abdominal cavity in patients with BAT can serve as a relatively reliable criterion that allows predicting the presence of intra-abdominal complications of trauma with a high degree of confidence, since the positive predictive value (VPV) for this criterion is 94.2% (Table 1). At the same time, it should be borne in mind that the absence of pathological effusion in the abdominal cavity on ultrasound does not always exclude the presence of an injury to the abdominal organs and cannot serve as a contraindication to surgical intervention. Thus, our calculations of the negative predictive value (NPV) for the diagnostic sign "free fluid in the abdominal cavity" show a low value (76.8%) of this criterion in a significant exclusion of abdominal trauma.

When studying the feasibility and effectiveness of using the sonographic criterion "presence of free fluid in the abdominal cavity" in determining the tactics of surgical treatment of patients with BAT, it became necessary to develop a method for measuring the volume of hemoperitoneum. In order to solve this problem, 67 patients with BAT were selected, in whom the ratio of the volume of hemoperitoneum, assessed intraoperatively, and the width and extent of free fluid in the abdominal cavity, assessed by ultrasound was assessed (Table 2).

Free liquid layer width	1 region		2 region		>3 region	
	free liquid V	n	free liquid V	n	free liquid V	n
<1 cm	169,2±72,3	13	418,2±160,1	11	633,3±152,8	3
1-2 cm	250,0±129,1	4	575,0±103,5	8	1233,3±111,8	9
2-3 cm	450,0±129,1	4	966,7±57,7	3	1740,0±207,4	5
3-4 cm	600	1	1233,3±152,8	3	2500	1
>4 cm	500	1	1600	1	-	0
Total	265,2±163,4	23	669,2±359,7	26	1144,4±608,0	18

Table 2.
The volume of intraoperatively determined blood in the abdominal cavity depending on the ultrasound data of the layer width and the prevalence of free fluid, n=67

Our calculations show that the presence of a thin (up to 1 cm) strip of free fluid within one anatomical region indicates a hemoperitoneum volume of up to 200 ml. With the accumulation of up to 300 ml of blood in the abdominal cavity, the ultrasound picture is characterized by the presence of a layer of free fluid up to 2 cm wide within 1 anatomical region. For hemoperitoneum with a volume of 300-500 ml, visualization of a strip of free fluid up to 2 cm thick is typical, extending to 2 anatomical regions of the abdomen, or the presence of fluid within one area, but with a thickness exceeding 3 cm or more. Detection on ultrasound of free fluid in the abdominal cavity, extending to 3 or more areas indicates the presence of hemoperitoneum with a volume of more than 500 ml. The same volume of blood is also indicated by the presence of free fluid with a layer thickness on ultrasound of more than 2 cm in 2 areas, or any accumulation of free fluid with a thickness of more than 3 cm (Table 2).

The above calculations comparing the prevalence and thickness of the sonographically detected free fluid with the volume of intraoperative blood removed from the abdominal cavity made it possible to develop the «Scale for ultrasound assessment of hemoperitoneum volume in patients with abdominal trauma» (Table 3).

Liquid layer width	1 region	2 region	>3 region
<1 cm	<200	300-500	500-1000
1-2 cm	200-300	300-500	1000-1500
2-3 cm	300-500	500-1000	1500-2000
3-4 cm	300-500	1000-1500	>2000
>4 cm	300-500	1500-2000	>2000

Table 3.
Scale of ultrasound assessment of hemoperitoneum volume in patients with abdominal trauma

In order to assess the practical significance of preliminary measurement of the volume of free fluid in the abdominal cavity using ultrasound in patients with BAT, we decided to compare the volume of intraoperatively detected blood in the abdominal cavity (actual volume) with the nature and extent of the surgical intervention

performed (Table 4). Thus, in 44 (28.4%) patients with a free fluid volume in the abdominal cavity up to 300 ml, situations almost never occurred that required a mandatory wide laparotomy. Moreover, with this amount of free fluid (<300 ml), in 20.5% of cases (n=9) surgeons deal with stopped intra-abdominal bleeding, and therefore the volume of surgical intervention is limited only to debridement and drainage of the abdominal cavity.

Table 4.
Comparison of the volume of hemoperitoneum with the volume of surgical intervention performed, n=155

Intervention type	<300 мл, n=44		300-500 мл, n=34		>500 мл, n=77	
	Abs.	%	Abs.	%	Abs.	%
Sanitation and drainage of the abdominal cavity	9	20,5	1	2,9	-	0,0
Electrocoagulation of a bleeding vessel	23	52,3	6	17,6	3	3,9
Sewing up the gap I st. according to Moore parenchymal organ	6	13,6	10	29,4	2	2,6
Suturing of deserized sections of the intestine, ruptures of the mesentery and b. omentum	6	13,6	2	5,9	-	0,0
Sewing up the gap ≥II st. according to Moore parenchymal organ	-	0,0	6	17,6	24	31,2
Resection and removal of the organ	-	0,0	7	20,6	44	57,1
Suturing the wall of a hollow organ	-	0,0	2	5,9	4	5,2

Note: the table does not include 5 (3.1%) patients out of 160 patients in whom damage to internal organs and hemoperitoneum were not detected intraoperatively.

Here we would like to point out as a discussion that today there are numerous experimental and clinical studies [4-10], proving the possibility of spontaneous resorption of a sufficiently large volume of blood from the abdominal cavity, there is a need for additional study of the feasibility of expanding and concretizing the indications to conservative treatment of BAT in patients with ultrasound or MSCT with signs of a small volume of hemoperitoneum without clinical signs of ongoing internal bleeding. Moreover, our observations on the management of patients with a volume of free fluid in the abdominal cavity less than 300 ml (n=44) show that with this volume of hydroperitoneum in patients with BAT, there are practically no cases of damage to the hollow organs of the abdominal cavity.

In cases where the volume of intra-abdominal blood loss is 300-500 ml (n=34), more than half of the patients (19; 55.9%) underwent intraoperative surgical manipulations and procedures, such as debridement and drainage of the abdominal cavity, electrocoagulation of a bleeding vessel, suturing the gap I st. according to Moore of the parenchymal organ, suturing of the desorized sections of the intestine, ruptures of the mesentery and the greater omentum, without any special technical difficulties, can be performed using the laparoscopic technique using routinely used instruments without the use of expensive consumables. And taking into account the above 44 patients in whom the volume of hemoperitoneum did not exceed 300 ml, the proportion of patients potentially subject to elimination of intra-abdominal complications of trauma by laparoscopic method without the use of a wide laparotomy increases to 80.8% (63 patients out of 78) (Table 4).

In the presence of more than 500 ml of blood in the abdominal cavity (n=77), the possibilities for the use of laparoscopic techniques were extremely limited and occurred only in 5 (6.5%) patients (Table 4).

Our calculations show that the presence of up to 300 ml of blood in the abdominal cavity on ultrasound excludes with a high probability (RR=0.000) the presence of serious intra-abdominal injuries requiring a wide laparotomy. With a free fluid volume in the range of 300-500 ml, the “absolute risk of having significant damage to the abdominal organs” is 44.1% (EER = 0.441), and the relative risk (RR) is 0.472 units (doubtful sign). The highest relative risk (RR) was associated with a free fluid volume in the abdominal cavity of more than 500 ml, when the probability of having a serious intra-abdominal injury (EER) is 93.5%, and the relative risk seems to be absolute and is 4.862 units with 95% CI in the range from 3.074 to 7.692 units (Table 5).

Table 5.
Relative risk (RR) value for severe intra-abdominal injuries with different volumes of free fluid in the abdominal cavity

Index	Hemoperitoneum volume, мл		
	<300	300-500	>500
Absolute risk in the presence of a factor (EER)	0.000	0,441	0.935
Absolute risk in the absence of a factor (CER)	0.935	0,935	0.192
Relative risk (RR)	**0.000**	**0,472**	**4.862**
Relative risk standard error (S)	∞	0,195	0.234
Lower limit 95% CI (CI)	0.000	0,322	3.074
Upper limit 95% CI (CI)	NaN	0,692	7.692
Sensitivity (Se)	0.000	0,172	0.828
Specificity (Sp)	0.102	0,208	0.926

Conclusion

Among the various sonographic semiotics of intra-abdominal lesions in BAT, the most constant ultrasound signs are the presence of various volumes of free fluid in the abdominal cavity. The sensitivity, specificity and accuracy of ultrasound in detecting free fluid in the abdominal cavity seems to be quite high and amount to 88.3, 87.8 and 88.1%, respectively. The proposed approach to the ultrasound assessment of discrete volumes of free fluid in the abdominal cavity, based on the thickness of the fluid layer and its prevalence in the abdominal cavity, does not complicate or lengthen the FAST protocol procedure, and allows determining the critical volumes of hemoperitoneum, which are crucial in the choice of surgical tactics. treatment of BAT.

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Conflict of interest
The authors declare that they have no conflicts of interest

Keywords:
critical limb ischemia, peripheral artery diseases, diabetes mellitus, atherosclerosis, CLI, PAD, amputation

CRITICAL LIMB ISCHEMIA. LITERATURE REVIEW (PART 1)

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Abstract

Critical limb ischemia (CLI) is the final stage of peripheral arterial disease which may lead to the chronic restpain, loss of tissues and limbs. Despite the active development of new technologies, including endovascular and open surgical methods of treatment, and the development of various type of guidelines, CLI still remains an unresolved burden of vascular surgery around the world. In the first part of this review, we described the problem of PAD, in particular, critical lower limb ischemia and the role of diabetes mellitus in the progression of these pathologies. In addition, we tried to reveal the statistics of «small» and «large» amputations in different regions of the world, as well as their social and economic significance.

Аяқтардың критикалық ишемиясы. Әдебиет шолуы (1-Бөлім)

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Аңдатпа

Аяқтың критикалық ишемиясы перифериялық артерия ауруларының соңғы кезеңі болып табылады және қимылсыз созылмалы ауырсынумен, тіндерден және аяқтардан айырылу арқылы жүреді. Жаңа технологиялардың белсенді дамуына, соның ішінде эндоваскулярлық және ашық хирургиялық емдеу әдістеріне және әртүрлі нұсқаулардың дамуына қарамастан, аяқтың критикалық ишемиясы әлі күнге дейін бүкіл әлемде тамыр хирургиясының шешімін таппаған мәселесі болып қала береді. Осы шолудың бірінші бөлімінде біз төменгі аяқ ауруларының мәселелерін сипаттадық, атап айтқанда, төменгі аяқтың критикалық ишемиялары және осы патологиялардың дамуындағы қант диабетінің рөлі. Сонымен қатар, біз әлемнің әртүрлі аймақтарындағы «кіші» және «ірі» ампутациялардың статистикасын, сондай-ақ олардың әлеуметтік және экономикалық маңыздылығын ашуға тырыстық.

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Түйін сөздер:
аяқтың критикалық ишемиясы, перифериялық артерия ауруы, қант диабеті, атеросклероз, ампутация.

Критическая ишемия нижних конечностей. Обзор литературы (часть 1)

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Аннотация

Критическая ишемия нижней конечности (КИНК) является финальной стадией заболеваний периферических артерий и протекает с хроническими болями в покое, потерей ткани и конечности. Несмотря на активное развитие новых технологий, включающих эндоваскулярные и открытые хирургические методы лечения, и разработку различных методических рекомендаций, КИНК все еще остается нерешенным бременем сосудистой хирургии всего мира. В первой части данного обзора мы описали проблему заболеваний нижних конечностей, в частности, критической ишемии нижних конечностей и роль сахарного диабета в прогрессировании этих патологий. Кроме того, мы постарались раскрыть статистику «малых» и «больших» ампутаций в разных регионах мира, а также их социальную и экономическую значимость.

Конфликт интересов

Авторы заявляют об отсутствии конфликта интересов

Ключевые слова:

критическая ишемия нижних конечностей, заболевания периферических артерий, сахарный диабет, атеросклероз, КИНК, ЗПА, ампутация

Relevance

Critical lower limb ischemia (CLI) is the final stage of peripheral arterial diseases and occurs with chronic pain at rest, loss of tissue and limb. The most common causes of CLI are atherosclerosis and vascular complications of diabetes mellitus [1,2].

The role of diabetes mellitus

Diabetes mellitus (DM) is recognized worldwide as one of the most important noncommunicable diseases. The number of diabetic patients is constantly growing due to the increase in the size and age of the population, the urbanization of the territory, the prevalence of obesity and a lifestyle [3].

The etiological classification of diabetes basically divides diabetes mellitus into two main types: type 1 and type 2, with type 2 diabetes accounting for the bulk (>85%) of the total prevalence of diabetes [4]. According to the latest estimates, there were 425 million people with diabetes in the world in 2017, and this is expected to rise to 629 million by 2045 (Figure 1) [4].

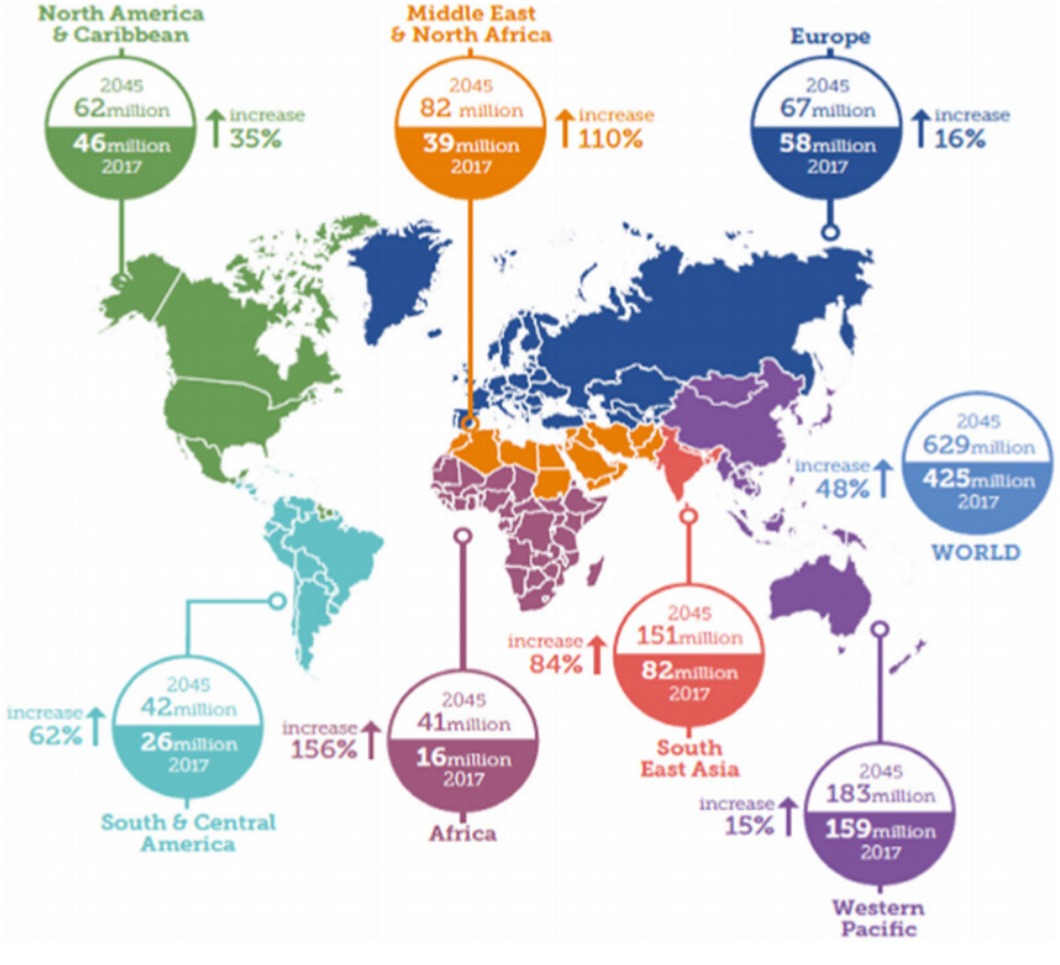

Figure 1.
Forecast of the incidence of DM by region (comparison of 2017 and 2045) [4]

Source: International Diabetes Federation. IDF diabetes Atlas. 8th edn. 2017

Determining the epidemiology of the comorbidity of diabetes and PAD faces the same challenges as measuring disease prevalence in PAD alone. Although the diagnosis of diabetes mellitus is well described, there is a wide variation in the severity and symptoms of PAD [5]. Thus, many patients may remain "asymptomatic", making the true prevalence of comorbid PAD and diabetes mellitus difficult to ascertain. According to the best estimates, diabetes mellitus increases the prevalence of PAD by 2-4 times [6].

Type 2 diabetes leads to a 2-fold increase in the risk of cardiovascular disease, 10-fold increase in blindness, and 20-fold increase in limb amputation [7].

Diabetic foot ulcers are described as a full-thickness skin defect below the ankle that heals slowly or does not heal. Among 1000 patients with ulcers (one year study and follow-up), median healing time for toe was 147 days (95% CI 135–159 days), 188 days for midfoot (95% CI 158–218 days), and 237 days for heel ulcers (95% CI 205–269 days) with healing success at 1 year of 79% for plantar and 73% for non-plantar ulcers [8].

In a systematic review of Jupiter D.C. et al described that a certain cohort of individuals with diabetic foot ulcers, older age, peripheral neuropathy, male sex, long duration of diabetes and poor glycemic control are associated with a high risk of mortality [9].

The growing burden of diabetes mellitus around the world every year is one of the main priorities of public health, requiring overwhelming efforts for patients and their caregivers, health systems and society as a whole.

Morbidity and mortality

Peripheral arterial disease (PAD) is associated with a reduced quality of life and an increased risk of cardiovascular disease. Data on the incidence of PAD in the population vary depending on the age category of the examined and methods for diagnosing arterial blood flow disorders. Despite its wide prevalence, the situation with PAD remains generally insufficiently resolved and underestimated [10].

It is estimated that more than 200 million people worldwide have PAD with a range of symptoms, a significant proportion of which occurs in the elderly (>20% of people over 80) [11]. Almost 40 million people with PAD live in Europe [12].

Patients with diabetes mellitus and PAD most often have the so-called "distal form", where damage to the popliteal or tibial arteries occurs with wall calcification compared to non-diabetic patients [13]. The consequences of the progression of diabetes mellitus and peripheral arterial disease are critical ischemia of the lower extremities and the so-called diabetic foot syndrome.

Critical lower limb ischemia (CLI) occurs with chronic pain at rest, loss of tissue and limb. The most common causes of CLI are atherosclerosis and vascular complications of diabetes mellitus. In addition, severe atherosclerotic lesions of the arteries of the popliteal segment and below are often observed in patients with both diabetes and CLI [14].

There is a close relationship between diabetes mellitus and CLI [15]. The annual incidence of CLI is 100 cases per 100,000, and mortality reaches more than 20% in the first 6 months after diagnosis [16]. In a separate population of PAD patients with CLI, the estimated prevalence of diabetes mellitus ranged from 27% to 76% [17].

Most patients with CLI are in the final stages of their lives. A meta-analysis of studies of patients with CLI describes mortality from 10 to 54.3 patients with diabetes [18]. Mortality rates show the severity of the disease over time. Thus, the 5-year mortality associated with CLI without amputation ranges from 55% to 65% (Table 1) [19]. For example, this exceeds the 5-year mortality from breast cancer in women (10%), colon cancer (35%) and myeloma (50%) [20].

Table 1.
Comparison of 5-Year mortality rates across diseases

Disease	5-year mortality rate
Critical limb-threatening ischemia (without amputation)	55-65%
Female breast cancer	10%
Bladder cancer	23%
Colon cancer	35%
Myeloma	50%
Lung and bronchus cancer	82%
Pancreatic cancer	92%

Among patients who underwent a "major" amputation for CLI (below or above the knee), mortality at 1 year was 40.4% in a recent US Medicare study; This is 10% higher than in patients diagnosed with CLI who did not undergo amputation, where the annual mortality rate was 30% [21].

Treatment of critical lower limb ischemia in patients with diabetes mellitus remains an urgent problem. The treatment of this category of patients presents certain difficulties, which are most often associated with multilevel and distal lesions of the arteries of the lower extremities, the presence of severe concomitant pathology.

Amputation statistics

Every year, more than 1 million lower limb amputations are performed in the world for diabetes mellitus, more than 600 thousand patients lose their sight, and approximately 500 thousand patients

develop renal failure [22]. More than 50% of all non-traumatic amputations occur in patients with diabetes mellitus [23].

Thus, in a systematic review by Moxey P.W. et al that rates of major amputations varied significantly (from 3.6 to 68.4 per 100,000 per year) around the world, likely due to differences in ethnicity, social deprivation, and, in particular, the prevalence of DM [24]. According to another systematic review by Narres M. Et al, including 19 publications, the risk of lower limb amputation in people with diabetes ranged from 7.4 to 41.3 per 100,000 [25].

Diabetes mellitus and PAD independently have a high risk of amputation [26]. Every year, more than 1 million lower limb amputations are performed in the world for diabetes mellitus, more than 600 thousand patients lose their sight, and approximately 500 thousand patients develop renal failure [22].

According to Vamos et al. and Trautner et al. people with diabetes have a 40 times greater risk of LEA compared to the general population, and approximately half of all people undergoing non-traumatic amputations are diagnosed with diabetes mellitus [27,28].

In the United States in 2015, about 504,000 people (out of a total population of 295.5 million) were living after a “major” amputation due to PAD, and this figure was predicted to more than double by 2050 [29]. According to a study of about 100,000 «major» lower limb amputations in the United States, more than half were associated with diabetes mellitus and PAD [30,31]. Other studies have shown that between 25% and 90% of amputations in study populations are associated with diabetes mellitus. [32].

In Germany, the absolute number of amputations was 57,637 in 2014, of which 13,048 were major amputations. The number of minor amputations increased from 35,513 in 2014. The number of amputations per 100,000 inhabitants was 43.9 in 2014, an increase of 25.4% [33].

It is worth noting that this range of relative risks of amputation exceeds that of people with diabetes and mortality from coronary heart disease by 3.5 (among women) and by 2.1 (among men). A significant reduction in the incidence of lower limb amputation has been shown in specific risk groups after the establishment of specialized clinics for the treatment of diabetic foot [34.].

In Kazakhstan, data on the number of amputations was taken from the National Patient Database (Electronic Register of Inpatients), where patients were classified according to ICD-10, as well as amputations according to the ICD-9 code (Table 2). Based on these data, the absolute number of lower limb amputations was 16,073, which corresponds to 87.9 per 100,000 population.

Type of amputation	Number Rate	per 100000 population
ABOVE THE KNEE AMPUTATION	597	3,26
AMPUTIATION OF THE ANKLE JOINT	404	2,21
AMPUTION OF LOWER LIMB, NOT OTHERWISE SPECIFIED	2602	14,2
TOE AMPUTATION	8094	44,3
FOOT AMPUTATION	3797	20,8
Total	**16073**	**87,9**

Table 2.
Types of amputation of patients in Kazakhstan for 2020

Social and economic importance

Amputation for diabetes mellitus and PAD represents a huge burden for patients, families and communities. At the patient level, of those who undergo amputations as a result of diabetes mellitus or PAD, >55% are permanently disabled thereafter. A similar number, especially those who undergo above-the-knee amputations, never return to ambulatory status [31].

In healthcare systems, patients with comorbid DM and PAD place a significant burden on the healthcare system. So, for example, according to some estimates, according to the Medicare insurance program in the United States, in just one year, the cost of patients with PAD exceeded $84 billion [35,36]. Among those with PAD and DM who require intervention, they are the most expensive, with an average annual Medicare cost of ≈$120,000 per patient compared to $70,000 for non-diabetics per year of treatment [37]. The intensification of treatment inevitably leads to an increase in the cost of treatment, however, it is clear that investing in effective methods of treating type 2 diabetes will slow down the occurrence of more costly complications. Thus, the earlier insulin therapy is started, the greater the cost-effectiveness.

Conclusion

Solving the problem of critical ischemia requires not only the development of technology, but also complex timely diagnosis and treatment, which makes the problem one of the priorities of public health. Peripheral arterial disease in diabetic patients is much more aggressive, with early involvement of large vessels coupled with distal symmetrical neuropathy. The need for high amputation in diabetics occurs 5-10 times more often compared to non-diabetics. The growing burden of diabetes mellitus around the world every year is one of the main priorities of public health, requiring overwhelming efforts for patients and their caregivers, health systems and society as a whole.

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COMPREHENSIVE TREATMENT OF DEEP FACIAL BURNS. A CLINICAL CASE

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Conflict of interest
The authors declare that they have no conflicts of interest

Keywords:
burn, face, operation, physiotherapy

Abstract

The article summarizes a case from practice, which describes the comprehensive treatment of a patient with a deep contact burn of the face.

Throughout the development of humankind, people have been faced with the need to treat severe wounds, with facial injuries being of particular importance. Ancient sources describe that facial injuries were very common in Ancient India and the countries of the Middle East.

Patient S. was admitted to the Almaty City Emergency Hospital in 2019. She received a thermal injury at home, according to the patient, she lost consciousness while cooking and fell on a burning gas stove burner. Upon admission, the general condition of the patient was severe, due to the injury and the presence of somatic pathology.

The postoperative period was uneventful. Thus, in order to obtain satisfactory results in the surgical treatment of deep burns of the face, one operation is not enough, complex treatment is required, which includes physiotherapy and corrective operations, this is the only way to achieve the optimal, i.e. desired result. The need to develop new recommendations and their practical implementation for the treatment of this pathology will improve the quality and optimize the treatment of victims.

Беттің терең күйіктерін кешенді емдеу. Клиникалық жағдай

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Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Түйін сөздер:
күйік, бет, операция, физиотерапия.

Аңдатпа

Мақалада бетінің терең жанасу күйігі бар науқасты кешенді емдеу сипатталған тәжірибеден алынған жағдай жинақталған.

Адамзаттың бүкіл дамуы барысында адамдар ерекше маңызды бет жарақаттары бар ауыр жараларды емдеу қажеттілігіне тап болып жатады. Ежелгі дереккөздерде бет жарақаттары Ежелгі Үндістан мен Таяу Шығыста жиі болғанын сипатталады.

Науқас С. 2019 жылы Алматы қалалық жедел жәрдем ауруханасына түскен. Ол үйінде термиялық жарақат алған, науқастың айтуынша, тамақ пісіру кезінде есінен танып, жанып жатқан газ плитасының оттығына құлаған. Жарақаттануға және соматикалық патологияның болуына байланысты түскен кездегі жалпы жағдайы ауыр,

Операциядан кейінгі кезең бірқалыпты өтті. Осылайша, беттің терең күйіктерін хирургиялық емдеуде қанағаттанарлық нәтиже алу үшін бір операция жеткіліксіз, күрделі емдеу қажет, оның ішінде физиотерапия және түзету операциялары қажет, тек осылай ғана оңтайлы нәтижеге, яғни қалаған нәтижеге қол жеткізуге болады. Осы патологияны емдеу үшін жаңа ұсыныстарды әзірлеу және оларды практикалық енгізу қажеттілігі зардап шеккендерді емдеудің сапасын жақсартуға және оңтайландыруға мүмкіндік береді.

Комплексное лечение глубоких ожогов лица. Клиническийслучай

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Аннотация

В статье обобщен случай из практики, в котором описано комплексное лечение больного с глубоким контактным ожогом лица.

На протяжении всего развития человечества люди сталкивались с необходимостью лечения тяжелых ран, при этом особое значение имели травмы лица. Древние источники описывают, что травмы лица были очень распространены в Древней Индии и странах Ближнего Востока.

Больная С. поступила в Алматинскую городскую больницу скорой медицинской помощи в 2019 году. Получила термическую травму дома, со слов больной, во время приготовления пищи потеряла сознание и упала на горящую конфорку газовой плиты. При поступлении общее состояние тяжелое, в связи с травмой и наличием соматической патологии.

Послеоперационный период протекал гладко. Таким образом, для получения удовлетворительных результатов при хирургическом лечении глубоких ожогов лица одной операции недостаточно, требуется комплексное лечение, включающее физиотерапевтические и корригирующие операции, только так можно добиться оптимального, т.е. желаемого результата. . Необходимость разработки новых рекомендаций и их практического внедрения для лечения данной патологии позволит повысить качество и оптимизировать лечение пострадавших.

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Ключевые слова:
ожог, лицо, операция, физиотерапия

Relevance

Throughout the development of humankind, people have been faced with the need to treat severe wounds, with facial injuries being of particular importance. Ancient sources describe that facial injuries were very common in Ancient India and the countries of the Middle East [1, 2]. They caused serious dysfunction of the organs of the face, which largely explains the attempts to develop ways to restore the lost skin. With the development of society, attention to the appearance of a person has grown significantly. Nowadays facial defects, in addition to functional disorders, cause severe emotional distress and inevitable, to a greater or lesser extent, psychological disorders that impede social adaptation. Therefore, in the XXI century treatment of victims with injuries of the maxillofacial region has become of great importance. Limited deep burns of the face account for 2 to 6.3% of the total structure of burn injuries [3, 4]. Currently, in the treatment of victims with deep burns, active surgical tactics are justified regardless of the area of skin damage [5-7]. In most hospitals, the stratification of the severity of the condition of the burnt depends on the area and depth of the burn. Modern methodology requires assessing the severity of the condition and making a decision on the choice of treatment tactics based on the probability of an unfavorable outcome of the disease, i.e., based on the prognosis [3]. Severely burned patients need to perform necrectomy no later than 3 days after the injury, extremely severely burned patients - on the 1st-2nd day with simultaneous autodermoplasty [8]. Subsequently, victims with deep facial burns who were admitted early after injury should undergo necrectomy as soon as possible. Treatment of deep facial burns is one of the most difficult tasks in combustiology and reconstructive plastic surgery. This is due to the high significance of the face in functional and aesthetic terms [9-10]. The area of the face is equal to 3.12% of the body surface. However, despite the small area, functionally important organs are concentrated in this area of the body [10]. In the treatment of deep burns of the face, the opinions of specialists in the choice of surgical tactics differ. According to the literature data, scar tissue is formed after 6-12 months [12-13]. Therefore, for a long time, surgical treatment of the consequences of facial burns was performed 1 year after the injury, since in the early post-traumatic period the operation was accompanied by profuse blood loss, reduced mobility of fresh scars, eruption of scar-modified flaps with suture material, and the remaining scarring process caused recurrence of deformities [14]. Clarkson objected to early surgical treatment of burn cicatricial deformity in patients, since he believed that the later the operation is performed, the better the result [15]. Thus, V. S. Savchin believes that burn wounds of the face need to be cleansed of necrotic tissues as early as possible and skin autotransplantation, since independent rejection of necrotic tissues, the formation of a granulating surface and skin grafting do not always give satisfactory results, but, on the contrary, cause the formation of gross cicatricial deformities. Even the use of split skin, which is more prone to retraction than full-thickness skin, does notmean leading to gross scarring. Great difficulties arise in the defeat of areas

of the face with mobile tissues and natural openings, in particular the palpebral fissure. Despite the early necrectomy, autodermoplasty with full-thickness skin, the process of scarring from the 3rd week can lead to eversion of the eyelids. Long-term blepharorrhaphy does not give the desired effect. It is almost impossible to keep the eyelid in a straightened state. Retraction of transplanted grafts makes the face mask-like, depriving it of natural expression and facial expressions. Despite all modern methods of surgical treatment, the appearance of a person after reconstructive surgery of the face changes beyond recognition. Attempts to improve cosmetic results become ineffective at some point and should be discontinued. Thus, at present there is no single tactic for the treatment of deep burns of the face, which is the reason for the continuing high frequency of functional, aesthetic disorders, increased disability in such patients. The development and practical implementation of recommendations for the treatment of this pathology will improve the quality and optimize the treatment of victims [16-20].

Case study

Patient S. was admitted to the Almaty City Emergency Hospital in 2019. She received a thermal injury at home, according to the patient, she lost consciousness while cooking and fell on a burning gas stove burner. Upon admission, the general condition of the patient was severe, due to the injury and the presence of somatic pathology.

Locally: the entire left half of the face from the scalp, the left auricle is covered with a dry scab of a dirty gray color, of a dense consistency. Given the severity and nature of the injury, the patient was hospitalized in the intensive care unit.

After relief of shock, she was transferred to the traumatology department. Where general, analgesic, infusion, detoxification therapy and local treatment of wounds by the closed method were carried out, chemical necrolisis was performed with Shnyrev's paste for 2.5 weeks, and necrectomy was performed at the beginning of 3 weeks. At the end of the 4th week, at the beginning of the 5th week, an operation was performed - delayed autodermoplasty on granulating wounds of the face and scalp.

After the operation period proceeded without complications, the first dressing was made after 48 hours, on the dressing: there was a disease of the graft (the edges of the grafts), which were stopped with a solution of dimexide diluted with a solution of furacillin. (Fig. 1-7). On the 10th day, the grafts survived by 99% and the patient was discharged for outpatient aftercare at the place of residence. The patient was followed up for 2 years.The patient after 2 months noted the eversion of the upper eyelid, asymmetry of the face, due to the formation of hypertrophic scars of the upper left eyelid in the postoperative period in the rehabilitation period, physiotherapy was carried out with the drug fermenkol for 6 months.

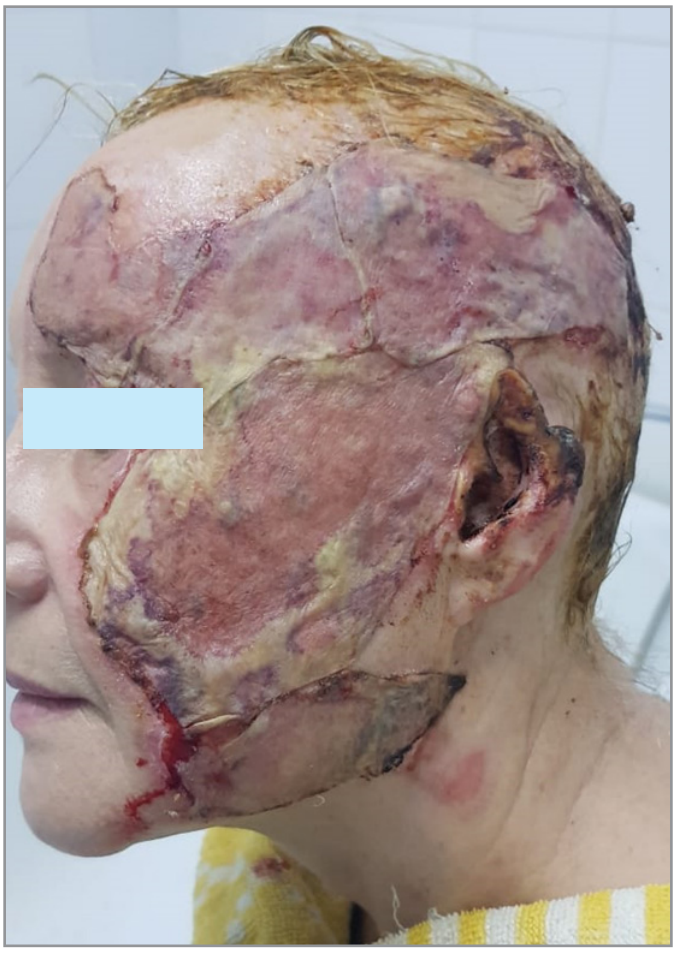


Figure 1.
The first 48 hours after surgery

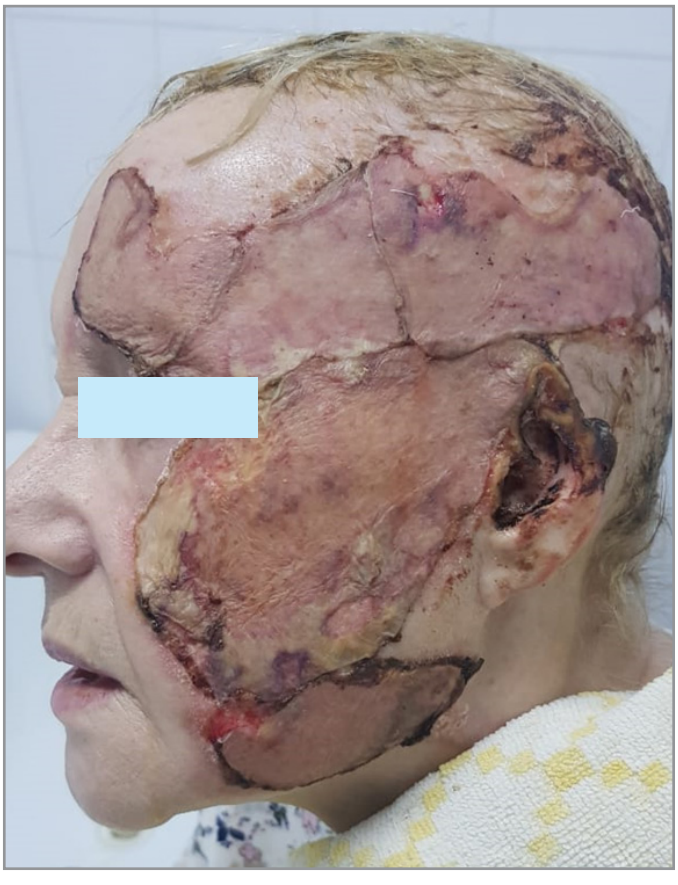


Figure 2.
2 weeks later

After 6 months, in order to eliminate the eversion of the left eyelid, the excision of the scar, blepharoplasty (free autodermoplasty) was performed. The postoperative period was uneventful. Thus, in order to obtain satisfactory results in the surgical treatment of deep burns of the face, one operation is not enough, complex treatment is required, which includes physiotherapy and corrective operations, this is the only way to achieve the optimal, i.e. desired result. The need to develop new recommendations and their practical implementation for the treatment of this pathology will improve the quality and optimize the treatment of victims.

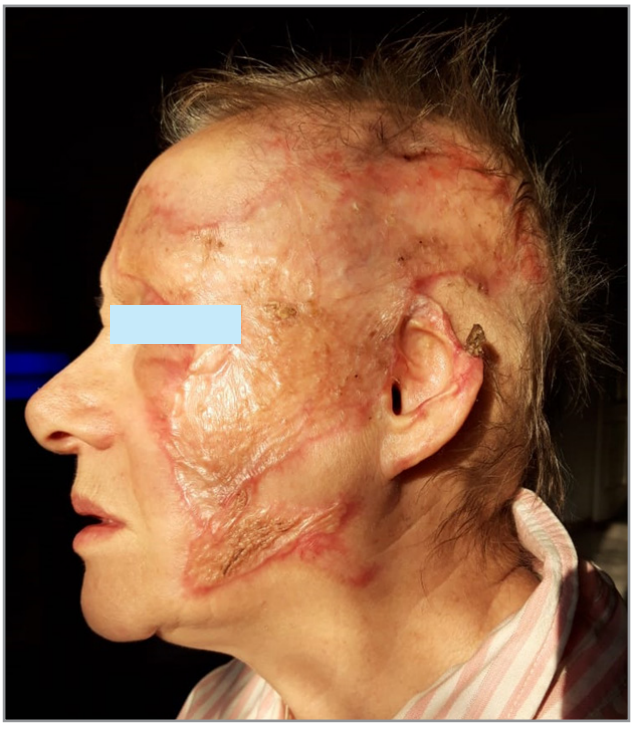


Figure 3.
2 months later

Figure 4.
4 months later

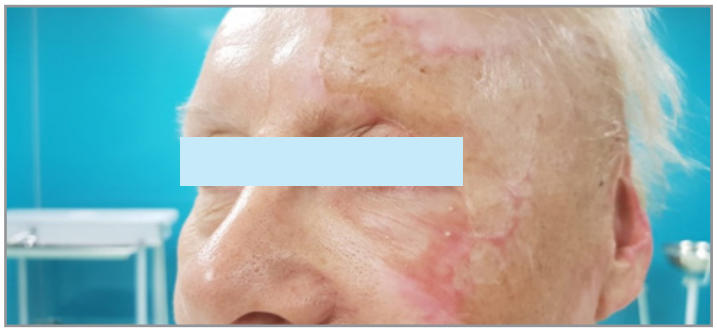


Figure 5.
4 months later

Figure 6.
6 months later

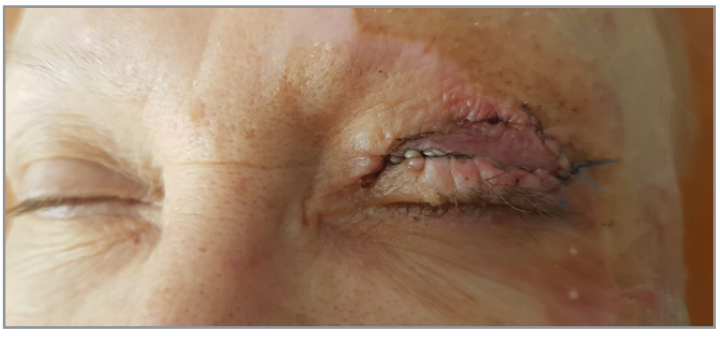
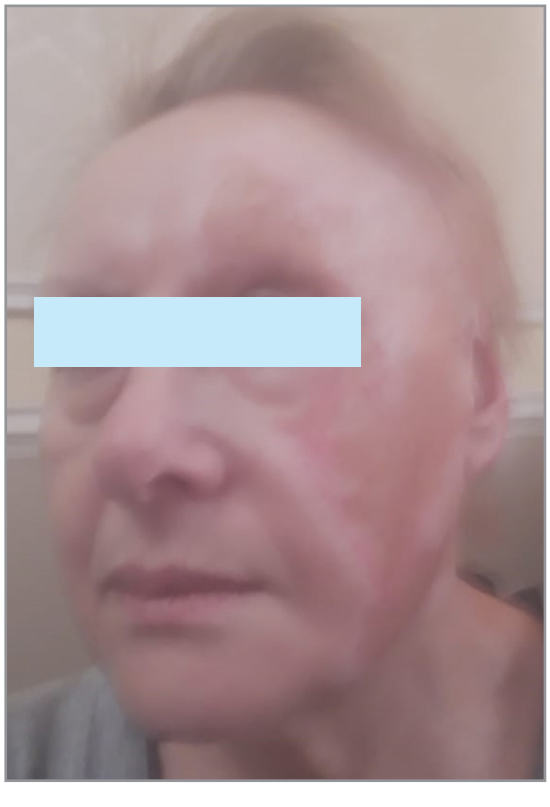


Figure 7.
At present time



Conclusions

To obtain satisfactory results in the surgical treatment of deep burns of the face, one performed operation is not considered to be sufficient , no matter what kind of it is, i.e. primary necrectomy and delayed necrectomy followed by autodermoplasty for granulating wounds.

Comprehensive treatment is required, which includes physiotherapy and corrective surgeries, this is the only way to achieve the desired result.

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The authors declare that they have no conflicts of interest

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echinococcal cyst, liver hidatidosis, PAIR, Albendazol, pericystectomy

MODERN APPROACHES IN THE DIAGNOSTICS AND TREATMENT OF CYSTIC LIVER ECHINOCOCCOSIS. LITERATURE REVIEW

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Abstract

Liver echinococcosis is a severe zoonotic disease of cosmopolitan nature caused by cestodes of the genus Echinococcus from the family Taeniidae that leads to cystic and alveolar echinococcosis that forms a significant problem in public health worldwide.

***The purpose** of this work is to analyze a literature review of modern approaches in the diagnostics and treatment of liver cystous echinococcosis*

***Material and methods.** We systematically searched the literature and selected sources from MEDLINE, PubMed, Scopus, Elsevier, E-library, Google Scholar as well as research papers and online educational publications in various languages. Forty three papers that met the inclusion criteria were included.*

***Results.** The review article presents epidemiology, methods of diagnosis and treatment of cystic liver echinococcus.*

***Conclusion.** Thus, among the modern approaches in diagnostics of cystic liver echinococcosis, ultrasound is the method of choice, also CT, MRI, ERCP are methods used for identifying complications. Morever, various surgical methods in combination with antiparasitic therapy decrease the risk and recurrence of cystic liver echinococcosis.*

Бауырдың кистозды эхинококкозын анықтау мен емдеудің қазіргі заманауи тәсілдері. Әдебиет шолуы.

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Аңдатпа

Бауыр эхинококкозы - космополитикалық сипаттағы ауыр зоонозды ауру, taeniidae тұқымдасының Echinococcus цестодтарынан туындайды, және де кистозды және альвеолярлы эхинококкозға шалдықтыратын бұл ауру бүкіл әлем бойынша денсаулық сақтауы саласындағы өзекті мәселе болып табылады.

***Жұмыстың мақсаты –** бауырдың кистозды эхинококкозын диагностикалау мен емдеудің заманауи тәсілдеріне әдеби шолу.*

***Материал және әдістер.** Біз жүйелі түрде әдебиеттерді іздедік және MEDLINE, PubMed, Scopus, Elsevier, E-library, Google Scholar дереккөздерін, сондай-ақ әртүрлі тілдердегі зерттеу жұмыстары мен онлайн білім беру басылымдарын таңдадық. Қосылу критерийлеріне сәйкес келетін қырық үш құжат енгізілді.*

***Нәтижелер.** Бұл мақалада бауыр эхинококкының эпидемиологиясы, диагностикасы және емдеу әдістері берілген.*

***Қорытынды.** Осылайша, бауырдың кистозды эхинококкозын диагностикалаудағы заманауи әдістердің ішінде УДЗ таңдау әдісі болып табылады, сонымен қатар КТ, МРТ, ERCP асқынуларды анықтау үшін қолданылатын әдістер болып табылады. Сонымен қатар, әртүрлі хирургиялық әдістер антипаразиттік терапиямен біріктірілген бауыр эхинококкозының қаупін және қайталануын азайтады.*

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Түйін сөздер:
эхинококкоз кистасы, бауыр гидатидозы, PAIR, Альбендазол, перицистэктомия.

Современные подходы в диагностике и лечении кистозного эхинококкоза печени. Обзор литературы

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Аннотация

Эхинококкоз печени – тяжелое зоонозное заболевание космополитической природы, вызываемое цестодами рода Echinococcus семейства Taeniidae, приводящее к кистозному и альвеолярному эхинококкозу, формирующему значительную проблему здравоохранения во всем мире.

Цель работы – *анализ литературного обзора современных подходов в диагностике и лечении кистозного эхинококкоза печени.*

Материал и методы. *Мы систематически искали литературу и выбрали источники из MEDLINE, PubMed, Scopus, Elsevier, E-library, GoogleScholar, а также исследовательские работы и образовательные онлайн-публикации на разных языках. Были включены 43 статьи, отвечающие критериям включения.*

Результаты. *В обзорной статье представлены эпидемиология, методы диагностики и лечения кистозного эхинококка печени.*

Вывод. *Таким образом, среди современных подходов в диагностике кистозного эхинококкоза печени методом выбора является УЗИ, а для выявления осложнений используются КТ, МРТ, ЭРХПГ. Кроме того, различные хирургические методы в сочетании с антипаразитарной терапией снижают риск и рецидивы кистозного эхинококкоза печени.*

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Ключевые слова:
эхинококковая киста, гидатидоз печени, PAIR, альбендазол, перицистэктомия

Introduction

Liver echinococcosis (LE) is a severe zoonotic disease caused by cestodes of the genus *Echinococcus* from the family *Taeniidae*, affecting both humans and animals, consisting of eight currently recognized species and one genotypic cluster - *Echinococcus canadensis*. This pathology has a cosmopolitan nature and occurs in all continents of the globe except Antarctica [1]. The most dangerous and serious problem for public health are: *Echinococcus granulosus* and *Echinococcus multilocularis*, which cause cystic and alveolar echinococcosis, respectively [2].

Alveolar echinococcosis (AE) or alveococcosis, caused by *Echinococcus multilocularis*, causes a tumor-like liver disease that is widespread throughout the northern hemisphere of the globe, in parts of Asia and in southern regions of Tibet, and is an extremely serious disease that is associated with significant loss of life mainly due to the lack of treatment options. The life cycle of this pathology is associated with wildlife, with carnivorous canids, usually foxes, as the definitive hosts and various rodent species as intermediate hosts. However, dogs and cats can also serve as competent definitive hosts [3-4].

Cystic liver echinococcosis (CE) or hydatidosis is a cosmopolitan parasitic disease of humans and animals caused by infection with *Echinococcus granulosus*, the main sources of which are canines [5]. Like other cestodes, CE has intermediate and definitive hosts. Dogs are the definitive hosts, and mammalian ruminants are intermediate carriers of this tapeworm [6].

Studies have shown that CE is a serious problem in the Mediterranean countries with high prevalence in Spain, parts of Italy, Greece and Turkey [7], as well as Central Asian countries: Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan [8]. In Africa, there is an active transmission of *Echinococcus granulosus* between humans and animals (including wild animals) in countries: Libya, Tunisia, Algeria and Morocco [6]. In the countries of South America: in Argentina, Brazil, Chile, Peru and Uruguay, 5 thousand cases of CE are diagnosed every year [9].

Echinococcal cysts can be localized in almost any human tissue and organs, but most often affect the liver [10]. The lethal outcome from this pathology is associated with the development of many complications which accounts for 2-4% [11]. Due to the paucity of manifestations of clinical signs, CE is detected incidentally, mostly during routine check-ups [12].

Complications of CE include: allergic and anaphylactic reactions to dissemination of contents into the abdominal cavity; breakthrough into the biliary system with cholangitis and with or without obstructive jaundice; into the pleural cavity or into the lung, causing pleural echinococcosis or bronchial fistula [13].

Despite wide range of diagnostic and treatment modalities, there is yet no standardized protocol. This review aims to provide up-to-date information on the diagnosis and treatment of hepatic cystic echinococcosis in light of the available data.

Microbiology of the parasite:

Echinococcus granulosus is a small sized tape-

worm with various genotypes. Molecular biology has identified 10 genetic types within *E. granulosus* [14]. These are G1 and G2 - two lines of sheep; G3 and G4 - two lines of cattle; G4 horse line; G6 - camel line; G7 - pig line; G8 - cervid line; G9 - genotype in pigs in Poland; G10 - a line of reindeer in Eurasia. Of these, G1 is the most dangerous and endemic, most often associated with human infections [14].

There are two hosts in the life cycle of all Echinococcus species. The first is the definitive host, and the second is the "intermediate host" where the hydatid arises. The definitive hosts include cats, dogs, wolves and foxes. The adult worm is present in the intestines of the definitive hosts, causing intestinal parasitosis, the lifespan of which in the intestines of dogs is about 5 months and is excreted in the faeces [15]. Sheep and other herbivores become "intermediate hosts" when they eat grasses infested with these eggs. Humans are incidental hosts and do not play a significant role in the life cycle of Echinococcus, being an "intermediate host" for the parasite when they eat food contaminated with these eggs. The oncosphere, which comes out of the egg taken through the gastrointestinal tract, attaches to the intestinal wall with its hooks, then entering the bloodstream reaches the liver first. Thus, the most common site of injury in humans is the liver, which accounts for 50–70% of cases, followed by the lungs (20–30%), less often the spleen, kidneys, heart, bones, central nervous system, etc. organs [13-15]. The embryo loses its scolex when it enters the organ and takes the form of a cyst consisting of an exocyst and an endocyst. Inside the cyst there is a sterile transparent liquid, and outside there is fibrous capsule which is a granulomatous inflammatory reaction, that leads to the cyst being blocked by fibrous tissue [16].

Epidemiology in the world

Developed natural livestock farming, low socio-economic status, regional climate, as well as uncontrolled and unhygienic slaughter of animals increase morbidity. According to the World Health Organization (WHO), E. granulosus is endemic in South America, Eastern Europe, Russia, the Middle East and China, where the incidence rate among humans reaches 50 per 100,000 population [10, 13]. CE is also endemic in the Mediterranean countries with a high prevalence in Spain, Italy, Greece and Turkey, and in Central Asia: Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. In Africa, there is an active transmission of *Echinococcus granulosus* between humans and animals (including wild animals) in the countries: Libya, Tunisia, Algeria and Morocco. In South American countries: in Argentina, Brazil, Chile, Peru and Uruguay, 5,000 cases of CE are diagnosed annually [17].

Epidemiology in Kazakhstan

The Republic of Kazakhstan is an endemic region for echinococcosis with high incidence rates. It is estimated that in Kazakhstan, the prevalence of infection among sheep ranges from 20% to 25% among sheep aged 1 year and 74%-80% among sheep aged 6 years and older. Among wild and rural dogs, the prevalence of infection is 23% and 6%, respectively. Human infection has increased since the mid-1990s [17, 18]. The average yearly incidence in the country from 1974 to 1994 went up from 0.9 to 1.4 per 100,000 population. From 1995 to 2000, it increased from 1.4 to 5.9 cases.According to the results of research for the period from 2007 to 2016, in most regions of Kazakhstan, the incidence of CE dropped from 5.6 to 4.7 per 100 thousand population, respectively. A higher incidence was noted in the south of Kazakhstan, with the incidence rate from 7.0 to 10.5 cases per 100,000 population. We analyzed the primary incidence of liver echinococcosis in the Republic of Kazakhstan for 2018 – 2020. During the study period, 2,248 patients with LE aged 15 to 70 years were registered. The analysis revealed a decrease in morbidity over 3 years by 2.03 = from 5.77 to 3.74, however in the south of the country, morbidity rates remain at a high level [19].

Ultrasound in diagnostics

Liver CE is mainly diagnosed by ultrasound examination (ultrasound). It is the simplest method due to its accessibility and the safest due to its noninvasiveness and lack of radiation, and is also preferred for determining the stage, differential diagnosis and follow-up of most cystic lesions of the abdominal cavity [20-22]. Ultrasound is also an imaging tool for minimally invasive percutaneous interventions in interventional treatment of CE [23].

The particular significance of ultrasound is that portable ultrasound is important as a screening tool [24].

For questionable cysts, serology may be useful for differentiation. Although ultrasound is the method of choice for determining the stage and number of cysts, as well as the degree of the disease, computed tomography (CT) and magnetic resonance imaging (MRI) are useful under certain circumstances [25].

Computed tomography (CT)

CT is indicated in cases where there are difficulties in diagnosis by ultrasound in patients with excessive subcutaneous fat, and is also effective for assessing postoperative changes - calcification of cysts [25]. Calcification of the cyst occurs not only in inactive cysts in the late stage, but can develop in all stages.

CT with contrast is crucial in the differential diagnosis of focal liver lesions [26]. CT is often used to monitor the effectiveness of PAIR (Puncture, Aspiration, Injection of protoscolicidal agent and Reaspiration) in remote periods [19, 25].

Magnetic resonance imaging (MRI)

In complications associated with the breakthrough of echinococcal cysts into the bile ducts, MR cholangiography is the most preferable, moreover MRI can be used when ultrasound is not informative enough, and CT is contraindicated [19. 25]. MRI has a high sensitivity for detecting CE, especially for identifying the number of cysts, their size, location and relationship with neighboring structures. MR cholangiography is comparable to endoscopic retrograde cholangiography, for the assessment of cystobiliary fistulas [27].

Drug therapy

Antiparasitic therapy and CE surgical treatment complement each other and require an individual approach. Drug therapy is required for all patients after surgical treatment to prevent relapses.

Nowadays, albendazole (ABZ) is used in clinical

practice as the main drug for drug therapy of echinococcosis [28]. The daily dose ranges from 10 to 20 mg / kg. The duration of one continuous treatment cycle is from 21-60 days to several years, the number of cycles is 1-20 or more, the intervals between cycles are from 21 to 30 days. Also, this drug is used to reduce the risk of dissemination in PAIR and prevent relapse [19].

Operative method of treatment

In the modern world, minimally invasive interventions are becoming increasingly used in clinical practice: laparoscopic pericystectomies, percutaneous with ultrasound navigation and mini-access operations [19].

PAIR (punction, aspiration, injection, reaspiration).

Percutaneous puncture method of CE treatment under ultrasound guidance is designated by the abbreviation PAIR. This method is performed under endotracheal anesthesia due to the potentially high risk of anaphylactic reaction [28]. The advantages of PAIR are low traumatism, the possibility of numerous repetition of the procedure, the possibility of performing the procedure under local anesthesia in certain cases, and a shorter stay of patients in the postoperative period [19, 28].

The disadvantages of the percutaneous PAIR method are: the difficulty of evacuating the dense contents of the cyst in the presence of daughter cysts; the difficulties of complete fragmentation and removal of the chitinous membrane, the inability to remove the fibrous membrane, the danger of hemorrhagic complications during puncture [29].

Contraindications to PAIR:

• cyst infection;

• superficially located cysts,

• biliary fistulas;

• cysts localized in dangerous or hard-to-reach areas of the liver.

Injection of antiparasitic agents with PAIR includes the following solutions: 30% NaCl solution and 95% ethyl alcohol. Prevention with albendazole before and after PAIR is mandatory [19, 30].

According to Smego et al [31], 769 patients treated with ABZ + PAIR were compared with 952 patients treated surgically only. The conclusion from this study is that PAIR + ABZ is more effective than surgery and is associated with lower morbidity and mortality rates, reduced risk of relapse and shorter hospital stay.

Laparoscopic cholecystectomy

Laparoscopic surgery with CE is a technically complex surgical procedure. These surgical interventions are carried out only in specialized hepatopancreatobiliary centers with properly adapted equipment for this. For the first time, a laparoscopic approach for liver CE was applied in 1992 [32].

Advantages of laparoscopic access:

• shorter stay in the postoperative period;

• low risk of wound infections;

• less need for analgesics in the postoperative period [6].

Disadvantages:

• difficulties with access to cysts localized in the posterior sector;

• increased risk of contamination leakage [33]. Systemic allergic and anaphylactic reactions, sometimes up to coma, are not uncommon in the case of hydatid fluid on the peritoneum [34].

Open echinococcotomy (endocystectomy)

Radical operations aimed at liver CE repair include pericystectomy and liver resection, whereas endocystectomy is the removal of cyst contents and sterilization of the residual cavity with scolexide solutions in combination with partial cystectomy [19].

Endocystectomy is performed mainly with large cysts adjacent to large tubular structures, when it is impossible to perform pericystectomy, as well as in cases where there is suppuration of the cyst with abscessing [34]. Leaving a fibrous capsule increases the risk of postoperative complications and the risk of relapse of the disease [19, 34].

Many methods of treatment of the residual cavity are described: omentoplasty, capitation and external drainage, or synthetic fibrin. In a retrospective study of Baliket al with 304 patients [35], it was shown that external drainage has a significantly higher level of complications, such as infection of the residual cavity and the formation of bile fistulas.

We found only one randomized trial that compared radical surgery with conservative surgery. The conclusion was that conservative surgery leads to a significantly higher frequency of early relapses compared to radical surgery [36].

Pericystectomy

Pericystectomy is the total removal of an echinococcal cyst with a fibrous capsule [19, 36-37]. When the echinococcal cyst is mobilized and the fibrous capsule is isolated from the liver parenchyma in order to prevent complications, all tubular structures are carefully ligated and clipped. Excision of a parasitic cyst with a fibrous capsule (pericystectomy) is indicated for complicated forms of echinococcosis, especially with significant calcification of the fibrous capsule of the parasite. Complete removal of a cyst with a fibrous capsule is a more radical intervention, for it more reliably prevents relapses of the disease, and modern methods of hemostasis during surgery allow for intervention with minimal blood loss [37].

Total pericystectomy has long been considered the “gold standard” of CE treatment [38]. Radical resection of the liver for CE in comparison with partial cystectomy is safer in terms of complications and relapses [39].

Liver resection

Liver resection in echinococcosis is the most radical operation that provides the best guarantee against the occurrence of relapses of the disease [34]. Resection interventions have their advantages and disadvantages, the choice of technique is made by a specialist. In atypical operations, when only the affected area is excised and most of the liver is preserved, there is still a risk of bleeding.

Complications

Intraperitoneal rupture and breakthrough is the most common complication of CE and occurs in 3-17% of cases [40], as well as a breakthrough into the bile ducts [41]. Endoscopic retrograde cholangiopancreatography (ERCP) determines the presence of a cystobiliary fistula for choosing the treatment in the

pre- and postoperative periods. Endoscopic sphincterotomy for surgical treatment of large-diameter cysts can lower the frequency of postoperative biliary fistulas from 11.1% to 7.6% [41], and in the postoperative period it can also provide possibility to treat postoperative biliary fistulas [42].

Postoperative period

Follow-up in the early and late postoperative period is recommended for the first month, third month, sixth month and twelfth month in the first year, and then every six months for the following two years, and then once a year, depending on the relevant clinical conditions. With CE, it is challenging to estimate the frequency of relapses. Therefore, ultrasound monitoring is sometimes carried out for up to ten years, during which relapses have been reported, despite the treatment [23].

Conclusion

Antiparasitic therapy surpasses the placebo effect, but monotherapy is not effective with a separate application for each. Uncomplicated active cysts in stages C1 and C E3 a can be treated with PAIR + ABZ before and after surgery. Uncomplicated, inactive cysts (deceased echinococcosis) can be treated with a “watch and wait” strategy. Surgery is the primary choice in multivesicular cysts, as well as in the presence of cystobiliary fistulas. The combination of ABZ + surgical treatment is more advantageous in terms of relapse and complications [42].

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GRAVES DISEASE

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Abstract

Hyperthyroidism (Graves' disease (GD)), is a relatively rare disease in adults and children. Treatment options for adults and children are antithyroid drugs (ATD), radioactive iodine (RAI), or thyroidectomy, but the risks as well as benefits of each are different.

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Аңдатпа

Гипертиреоз (Грейвс ауруы (ГА)), ересектер мен балаларда салыстырмалы түрде сирек кездесетін ауру. Ересектер мен балалардағы емдеу нұсқалары антитиреоидты препараттар (АТП), радиоактивті йод (RAI) немесе тириоидэктомия болып табылады, бірақ әр әдістің қауіп-қатері мен пайдасы әртүрлі.

Болезнь Грейвса

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Аннотация

Гипертиреоз (болезнь Грейвса (БД)), является относительно редким заболеванием у взрослых и детей. Варианты лечения у взрослых и детей – антитиреоидные препараты (АТП), радиоактивный йод (RAI) или тириоидэктомия, но риски, а также преимущества каждого способа различны.

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Conflict of interest
The authors declare that they have no conflicts of interest

Keywords:
hyperthyroidism, diffuse toxic goiter, Graves' disease, radioactive iodine, thyroidectomy

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Introduction

Graves' disease is an autoimmune disease resulting in generalized hyperfunction of the thyroid gland, i.e., hyperthyroidism.

It is named after Robert Graves, the Irish doctor who described this form of hyperthyroidism about 150 years ago. It occurs 7-8 times more often in women than in men [1].

Etiology

It is generally recognized that Graves' disease has a pronounced hereditary component, implementing a significant role of genetic factors.

Human leukocyte antigen (HLA), CD40, CTLA-4, PTPN22, Tg and TSHR are the main genes contributing to hypertheriosis. Impaired immune response (autoaggression) proteintyrosine phosphatase, non-re-

ceptor type 22 (PTPN22). PTPN22 is a strong inhibitor of T-cell activation [2].

In Graves' disease these antibodies (called thyrotropin receptor antibodies (trab) or thyroid stimulating immunoglobulins (TSI) act in the opposite way [3].

Antibodies in Graves' disease bind to receptors on the surface of thyroid cells and stimulate these cells to overproduce and release thyroid hormones [4].

The term "primary hyperthyroidism" is sometimes used to refer to hyperthyroidism that develops as a result of thyroid disease. Secondary hyperthyroidism develops due to pathological processes occurring outside the thyroid gland, such as a TSH-secreting pituitary tumor. The 3 most common causes of thyrotoxicosis are also associated with thyroid hyperfunction:

• Diffuse thyroid hyperplasia associated with Graves' disease (85% of observations);
• hyperfunctional multinodular goiter;
• hyperfunctional thyroid adenoma.

Epidemiology

Iodine deficiency is the most common cause of goiter worldwide, affecting approximately 2.2 billion people. The prevalence and incidence of goiter depend on the degree of iodine deficiency. With mild iodine deficiency, the incidence of goiter is between 5% and 20%. With moderate deficiency, the prevalence increases to 20-30%, and with severe iodine deficiency, the incidence rises to over 30% [5].

Graves' disease is the most common cause of hyperthyroidism, accounting for 60% to 80% of hyperthyroidism cases. The prevalence in the general population is 1% to 1.5%. The incidence is 20 to 30 cases per year per 100,000 population [6].

Classification

Table 1.
According to the degree of enlargement of the thyroid gland (WHO) [7]

Grade	Characteristics
0	>No palpable or visible goitre.
1	A goitre that is palpable but not visible when the neck is in the normal position (i.e. the thyroid gland is not visibly enlarged). Nodules in a thyroid that is otherwise not enlarged fall into this category.
2	A swelling in the neck that is clearly visible when the neck is in a normal position and is consistent with an enlarged thyroid gland when the neck is palpated.

Table 2.
According to the severity of clinical manifestations and hormonal disturbances [8]

Subclinical (mildflow)	The clinical picture is absent or mild. TSH content is decreased, T4 and T3 levels are within the reference values.
Manifest (medium flow)	An elaborate clinical picture. The TSH content is significantly decreased, and the concentrations of T4 and T3 are elevated.
Complicated (severe flow)	Thyrotoxicosis and its complications: Atrial fibrillation, heart failure, relative adrenal insufficiency, dystrophic changes in the parenchymatous organs, psychosis, severe weight loss. TSH levels are significantly decreased, with elevated concentrations of T4 and T3 [8].

Diagnosis

Diagnosis begins with complaints and a general examination of the patient. Laboratory data are the main diagnostic measures for diagnosis. Namely - general blood test and biochemistry, determination of the content of TSH, T3, T4, pituitary hormones, antibody titer to the TSH receptor, "classical" antibodies to the thyroid gland titer. An ultrasound or MRI scan of the thyroid gland is also important [8].

Serology

Measurement of serum TSH has the highest sensitivity and specificity of any single blood test used in evaluating suspected hyperthyroidism and should be used as an initial screening test (Fig.1) [9].

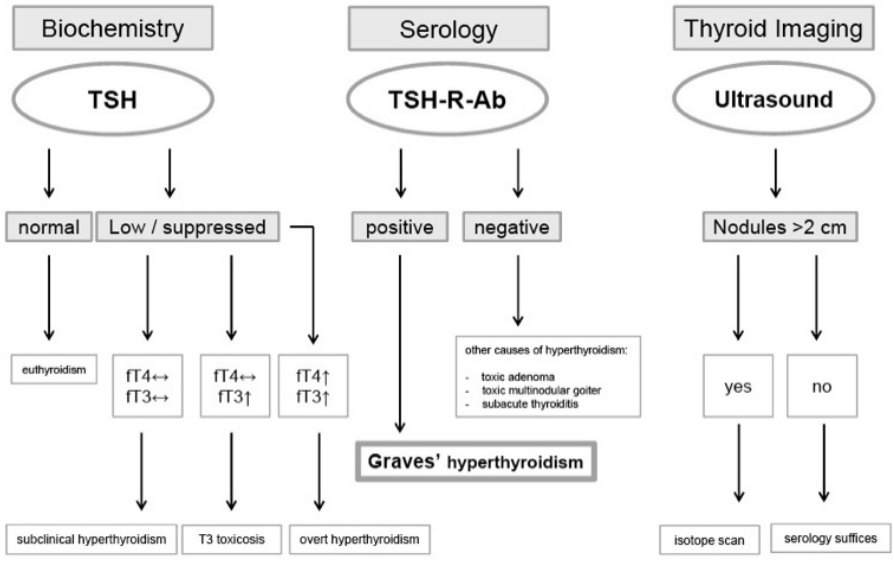

Figure 1.
Serology of Graves disease [9]

As in other autoimmune thyroid diseases, high levels of classical antithyroid antibodies - at-TPO and at-(at least 70-80% of cases) can be determined in HD [10].

Tactics patients management (Fig.2) [9].

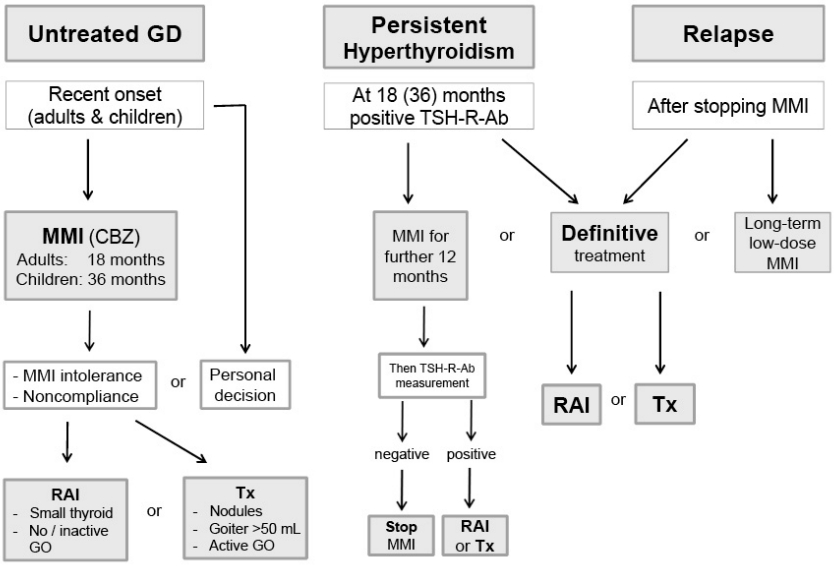

Figure 2.
Algorithm for the management of a patient with Graves' hyperthyroidism [9]

Differential diagnosis

Disease	Distinguishing features
Thyroid-producing pituitary adenoma	«-» TSH reaction to thyrolyberine
Thyroid cancer metastases	Surgical treatment in anamnesis
Iatrogenic thyrotoxicosis	History of taking lithium, interferon, and drugs containing large amounts of iodine
Multinodular toxic goiter	Heterogeneity of scintigraphicpattern [11].

Treatment

Methods of treatment:

- Conservative therapy
- RAI therapy
- Surgical treatment

Conservative therapy

Conducted with antithyroid therapy (ATT). The mechanisms of the drugs are as follows:

Intrathyroid inhibition:

- Iodine oxidation.
- Iodothyrosine compound.
- Thyroglobulin biosynthesis
- Follicular cell growth

Extrathyroid inhibition of T4/T3 conversion (PTU) [9].

The main ATT drugs are thionamides such as propylthiouracil (PTU), carbimazole (CBZ), and the active metabolite of CBZ, methimazole (MMI)

The usual daily maintenance doses of ATP in the titration regimen are 2.5-10 mg MMI and 50-100 mg PTU. In addition, daily doses of 30 mg MMI may be given in combination with the addition of levothyroxine (L-T4) (blocking and replacement mode) to avoid medication-induced hypothyroidism [12].

Advantages:

- Early treatment of the disease
- Availability

Disadvantages:

- Frequent relapses
- Duration of treatment
- Adverse complications (liver cirrhosis, toxic hepatitis, unresponsiveness to ATP) [13].

Both groups had recurrence of hyperthyroidism after discontinuation of methimazole, according to the results of the study. Secondary key findings were both clinical and subclinical hypo- and hyperthyroidism during methimazole treatment [14].

RAI radioactive iodine therapy

One of the treatments for Graves' disease is radioactive iodine therapy. The mechanism of action is that radioactive iodine (RAI) exerts its effect when it is absorbed by follicular thyroid cells, emitting beta-rays that further cause permanent local damage to thyroid tissue.

RAI treatment can predispose patients to irreversible hypothyroidism because it causes permanent destruction of thyroid tissue. Patients may require lifelong thyroxine therapy [15].

Radioiodine (RAI) therapy is contraindicated in the following cases:

- Pregnancy
- Breast-feeding
- Cancer without iodine absorption
- Graves' ophthalmopathy (moderate to severe)
- Severe thyrotoxicosis
- Vomiting
- Diarrhea [16].

Radioiodotherapy worsens the course of ophthalmopathy. This is because radiation, by affecting thyrocytes, leads to a massive release of antigens shared

with the retrobulbar tissue, which in turn stimulates the formation of antibodies that induce the appearance or activation of EOP [17].

Early complications
- Teratogenicity
- Bone marrow suppression
- Radiation-induced thyroiditis
- Transient thyrotoxicosis

Late complications
- Bone marrow depression
- Pulmonary fibrosis
- Leukemia
- Hypothyroidism [16].

Radioiodine therapy is an effective treatment for Graves' disease. A high dose of radioiodine provides a high remission rate. The use of radioiodine as a therapeutic agent is simple, safe, effective and cost-effective [18].

Surgical treatment

Thyroidectomy is the most commonly chosen treatment. In recent American and European surveys, surgery is the first-line treatment. However, thyroidectomy is an effective treatment when the thyroid gland is enlarged, when primary hyperparathyroidism or suspected malignant nodules are present, or when the patient wishes to avoid exposure to ATD (Anti Thyroid Drugs) or RAI (radioactive iodine).

Indications	Contraindications
Large goitre	Chronic diseases in the acute stage
Thyreostatic allergy	Contraindication of RAI [19].
Ineffectiveness of conservative therapy	

The advantages of thyroidectomy include no radioactive iodine risk, rapid control of hyperthyroidism and no detrimental effects on ophthalmopathy.

Advantages and disadvantages of total thyroidectomy for Graves' hyperthyroidism:

Advantages	Disadvantages
No recurrent hyperthyroidism	Risk of postoperative hypoparathyroidism
No radiation risk	Risk of recurrent laryngeal nerve palsy
Rapid control of hyperthyroidism	Persistent hypothyroidism
No evidence of harmful effects on the course of Graves' ophthalmopathy	Risks related to anaesthesia or surgery
	Hospitalisation
	Postoperative scarring

To minimize the risk of complications, surgery must be performed by a qualified surgeon. To minimize the risk of intra- or postoperative exacerbation of thyrotoxicosis, hyperthyroidism must be adequately controlled with ATD treatment before surgery. The use of saturated potassium iodide solution (SSKI) is useful in the immediate preoperative period (10 days) to reduce thyroid vascularisation and intraoperative blood loss (9).

Complications:

1. Post-operative bleeding (up to 6%)
2. Defeat of the recurrent laryngeal nerve and dysphonia (10%)
3. Hypoparathyroidism (20%) (20).

Despite all the variety of drug treatments for patients with hypertheriosis, it has lost its "predominant role" in the choice of treatment. As studies show, 50% of patients experience a relapse and 30% of patients are ineffective [21].

Predictors of relapse

Potential predictors of recurrence: marked thyroid enlargement, young age, high levels of TSH-R-Ab, and the presence of thyrotoxicosis complications [22].

Conclusion

After reviewing all treatment methods, comparing the advantages and disadvantages of each, we have concluded that surgical treatment is currently the "leading" treatment for Graves' Disease. Thanks to advances in surgery, surgical thyroid removal has been made safer by the development of new surgical, haemostatic and other techniques such as intraoperative monitoring of the recurrent laryngeal nerve. Thereby lowering the rate of complications in patients.

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MODERN ASPECTS OF DIAGNOSTICS OF AUTOIMMUNE DISEASES OF THE THYROID GLAND

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Conflict of interest
The authors declare that they have no conflicts of interest

Keywords:
autoimmune thyroiditis, diagnostic algorithm, needle biopsy

Abstract

Objective.*This research is meant to study the features of the clinical course and to develop an optimal algorithm for the diagnosis of autoimmune thyroid diseases.*

Material and methods.*The work is based on the examination and treatment data of 481 patients with autoimmune diseases of the thyroid gland, treated in the clinic. Diagnosis and treatment results of 481 patients were analyzed to develop an optimal algorithm for diagnosing autoimmune thyroiditis.The differential diagnostic capabilities of clinical, laboratory, and morphological examination methods of patients with autoimmune thyroid diseases have been specified.The study of long-term results of treatment was carried out on 340 patients, taking into account the various methods of treatment they underwent.*

Results.*The analysis of existing diagnostic tools and methods allowed us to develop an optimal algorithm for diagnosing autoimmune thyroid diseases, which is a complex of clinical, laboratory, and morphological methods that can reliably verify the diagnosis of autoimmune thyroiditis. Based on the examination results, it is possible to predict the likelihood of surgical treatment and to identify a group of patients in whom autoimmune processes can progress in the thyroid residue, contributing to the development of postoperative recurrence of the disease or causing its atrophy.*

Conclusion. *Based on the study's results, a rational algorithm for diagnostic search has been developed. The proposed algorithm allows, in the shortest possible time, to identify the presence of a form of autoimmune thyroid disease and to determine the optimal tactics to treat patients with autoimmune thyroiditis based on clinical, laboratory, immunological tests and instrumental examinations.*

Қалқанша безінің аутоиммунды ауруларының диагностикасының заманауи аспектілері

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Түйін сөздер:
аутоиммунды тиреоидит, диагностикалық алгоритм, ине биопсиясы.

Аңдатпа

Мақсаты. *Клиникалық курстың ерекшеліктерін зерттеу және аутоиммунды қалқанша безінің ауруларын диагностикалаудың оңтайлы алгоритмін құру.*

Материал және әдістер. *Жұмыс қалқанша безінің аутоиммунды аурулары бар науқастарды тексеру және емдеу деректеріне негізделген, клиникада 481 науқас емделген. Аутоиммунды тиреоидит диагностикасының оңтайлы алгоритмін жасау үшін 481 науқастың диагностикасы мен емдеу нәтижелері талданды. Қалқанша безінің аутоиммунды аурулары бар науқастарды зерттеудің клиникалық, зертханалық және морфологиялық әдістерінің дифференциалды диагностикалық мүмкіндіктері нақтыланды. 481 науқастың 312-сінде (64,9%) пункциялық биопсия жүргізілгенде, 39 (12,5%) науқаста қалқанша без тінінің жасушаларының атипия және қатерлі ісік белгілері анықталды. Емнің ұзақ мерзімді нәтижелерін зерттеу 340 (70,7%) науқаста жүргізілген әртүрлі емдеу әдістерін ескере отырып жүргізілді.*

Нәтижелер. *Қолданыстағы диагностикалық құралдар мен әдістерді талдау аутоиммунды тиреоидит диагнозын сенімді түрде тексеруге болатын клиникалық, зертханалық және морфологиялық әдістер кешені болып табылатын аутоиммунды қалқанша безінің ауруларын диагностикалаудың оңтайлы алгоритмін жасауға мүмкіндік берді. Тексеру нәтижелері бойынша хирургиялық емдеу ықтималдығын болжауға болады, сондай-ақ аутоиммундық процестер қалқанша безінің қалдығында ілгерілеуі мүмкін, бұл аурудың операциядан кейінгі қайталануының немесе аурудың қайталануының дамуына ықпал ететін науқастар тобын анықтауға болады. оның атрофиясын тудырады.*

Қорытынды. *Зерттеу нәтижелері бойынша диагностикалық іздеудің рационалды алгоритмі жасалды. Ұсынылған алгоритм мүмкіндігінше қысқа мерзімде аутоиммунды қалқанша безінің ауру түрін анықтауға және клиникалық, зертханалық, иммунологиялық зерттеулер мен аспаптық зерттеулер негізінде аутоиммунды тиреоидитпен ауыратын науқастарды емдеудің оңтайлы тактикасын анықтауға мүмкіндік береді.*

Современные аспекты диагностики аутоиммунных заболеваний щитовидной железы

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Аннотация

Цель. *Изучение особенностей клинического течения и разработка оптимального алгоритма диагностики аутоиммунных заболеваний щитовидной железы.*

Материал и методы. *Работа основана на данных обследования и лечения больных аутоиммунных заболеваний щитовидной железы, лечившихся в клинике 481 больного. Для разработки оптимального алгоритма диагностики аутоиммунного тиреоидита проанализированы результаты диагностики и лечения 481 больного. Уточнены дифференциально-диагностические возможности клинических, лабораторных и морфологических методов обследования больных аутоиммунными заболеваниями щитовидной железы. Пункционная биопсия, проведенная у 312 (64,9%) из 481 больного, выявила у 39 (12,5%) пациентов признаки атипии и малигнизации клеток щитовидной ткани. Изучение отдаленных результатов лечения проведено у 340 (70,7%) больных с учетом перенесенных ими различных методов лечения.*

Результаты. *Анализ существующих средств и способов диагностики позволил разработать оптимальный алгоритм диагностики аутоиммунных заболеваний щитовидной железы, который представляет собой комплекс клинических, лабораторных и морфологических способов, позволяющих достоверно верифицировать диагноз аутоиммунного тиреоидита. На основании результатов обследования можно прогнозировать вероятность проведения хирургического лечения, а также выделить группу больных, у которых в тиреоидном остатке могут прогрессировать аутоиммунные процессы, способствующие развитию послеоперационного рецидива болезни или вызывающие его атрофию.*

Заключение. *На основании полученных результатов исследования разработан рациональный алгоритм диагностического поиска. Предложенный алгоритм позволяет в наиболее кратчайшие сроки выявить наличие формы аутоиммунных заболеваний щитовидной железы, и определить оптимальную тактику лечения больных аутоиммунным тиреоидитом на основании клинических, лабораторных, иммунологических тестов и инструментальных обследований.*

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Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Ключевые слова:
аутоиммунный тиреоидит, алгоритм диагностики, пункционная биопсия

Introduction

According to the literature data, the frequency of autoimmune thyroid diseasesis 25-35% among all thyroid diseases and ranks second after diabetes among endocrinological diseases. Most often, autoimmune thyroid disease affects women aged 25-65 years. The clinical picture of autoimmune thyroid diseases is determined by the severity and prevalence of pathomorphological changes in the thyroid gland [1,2].

The available literature lacks data on the clinical course and a rational algorithm for the diagnostic data of patients with autoimmune thyroid disease. Despite studies on the main pathogenetic mechanisms, the diagnostic criteria and morphological changes in the thyroid gland in autoimmune thyroiditis are still not clear enough [3,4]. Autoimmune thyroiditis (AIT) is a typical representative of autoimmune diseases, characterized by immune inflammation of the thyroid gland. A characteristic morphological sign of AIT is lymphoplasmacytic infiltration of the thyroid tissue of the gland with obligatory autoimmune inflammation. The diffuse form of AIT occurs in approximately 40-60% of patients. The composition of cells in AIT is always constant; it combines cells of the lymphoid series, plasmacytic infiltration, and macrophages [1,2].

Meanwhile, in practice, the clinical diagnosis in medical institutions is often formulated as nodular (or multinodular) goiter. However, from a practical point of view, the identification of the main forms of autoimmune thyroid diseases is extremely important, since the use of an accurate classification will clearly establish the nature of the clinical course of the disease (with complications/ without complications), give an objective assessment of the prognosis of the disease, therefore, choose the optimal method of treating the disease. We must not forget that patients with autoimmune thyroid diseases have a higher risk of developing “thyroid cancer” than people who do not suffer from this disease [5,6].

In most cases, cytological examination of the punctate nodular formation of the thyroid gland allows you to determine the nature of the node. However, it is not always possible to verify the diagnosis of autoimmune thyroid diseases by cytological signs. Sometimes thyrocytes of benign follicular neoplasia by morphological characteristics do not allow reliable differentiation of a benign tumor - follicular adenoma

- from follicular carcinoma cells [7,8,9]. These same facts significantly complicate the identification of pathological changes in cells in autoimmune thyroiditis. Sometimes the term "follicular tumor" unites all nodular formations in the thyroid gland, including those formed against the background of AIT. In practice, we can talk about a benign tumor - follicular or microfollicular adenoma, often combined with autoimmune thyroiditis, so increasing the sensitivity and specificity of methods for diagnosing autoimmune thyroid diseases is important from the point of view of further treatment tactics for this category of patients [10,11].

The issue of early diagnosis of autoimmune thyroid diseases remains unresolved today since the disease has a subclinical course at the initial stage. Unfortunately, none of the research methods allows you to establish an accurate diagnosis. On the basis of anamnestic, clinical, and laboratory data (a decrease in the level of thyroid hormones, the presence of high titers of antithyroid antibodies in the blood) and an ultrasound examination of the thyroid gland, a diagnosis of autoimmune thyroiditis is established [12,13]. An important place in the diagnosis of autoimmune thyroiditis is occupied by ultrasound (ultrasound), as it provides the patient with ease of examination, painlessness, and safety. Despite all these advantages, the method still does not allow differentiating AIT from a number of other diseases. In addition, autoimmune thyroiditis can be combined with colloid goiter, so thyroid ultrasound can be considered an auxiliary method in the diagnosis of autoimmune thyroid diseases. Ultrasound gives us data on the size, localization, shape, anatomical and topographic relationships of the gland with other organs [14,15].

Currently, doctors have clinical, instrumental, laboratory, and morphological methods in their arsenal for diagnosing autoimmune thyroid diseases. At the same time, the variety of clinical variants of autoimmune thyropathies, the lack of a generally recognized morphological classification of the disease, often atypical symptoms of the disease, and its early stage are factors that can lead to diagnostic errors and incorrect treatment tactics [16,17].

Further research on the problem of diagnosis and treatment of autoimmune thyroid diseases should be directed towards the development of a clear algorithm for diagnosing AIT using modern diagnostic tools and methods, as well as a reasonable approach to choosing the optimal method of treating autoimmune thyroid diseases, taking into account the individual characteristics of the patient. Thus, the increase in the incidence of the disease, the difficulties and lack of effectiveness of existing diagnostic methods, and the conflicting opinions of researchers in the approaches to the diagnosis and treatment of patients with autoimmune thyroid diseases indicate the urgency of the problem.

Purpose of the study

To study the features of the clinical course and to develop an optimal algorithm for the diagnosis of autoimmune thyroid diseases.

Material and methods

The work is based on the examination and treatment data of patients with autoimmune diseases of the thyroid gland treated at the clinic. For the period from 2008 to 2021, 481 patients aged 27 to 73 years were examined. Examination and treatment results of patients were analyzed to develop anoptimal algorithm for diagnosing autoimmune thyroid diseases. The differential diagnostic capabilities of clinical, instrumental, laboratory, and morphological examination methods of patients with autoimmune thyroiditis have been specified. Puncture biopsy performed in 312 (64,9%) of 481 patients revealed signs of atypia and malignancy of thyroid cells in 39 (12,5%) patients. All 39 patients were diagnosed with a hypertrophic form of autoimmune thyroiditis. The study of long-term results of treatment was carried out on 340 (70,7%) patients with autoimmune thyroid diseases. Patients were followed up for 1 to 5 years or more.

The algorithm for laboratory examination of patients with autoimmune thyroid diseases includes traditional tests: clinical blood count, general urinalysis, biochemical blood test, and blood electrolytes. Determination of thyroid status and the level of autoantibodies to antigenic structures of the thyroid tissue was carried out by measuring the concentration of thyroid hormones (free T_3, free T_4),TSHand antibodies to thyroid tissues Anti-TG, Anti-TPO in the blood serum of patients with enzyme immunoassay method.

In order to clarify the nature and extent of damage to the peripheral vascular bed of the thyroid gland, all patients, without exception, underwent ultrasound research methods, including ultrasound duplex angioscanning, color Doppler mapping, and visualization in the color Doppler energy mode.

During the cytological study, we studied the quantitative composition of cells using the morphometry method. In cytological preparations, an analysis of the quantitative composition of neutrophils, macrophages, lymphocytes, fibroblasts, and other cells was carried out. To assess the effectiveness of the treatment, a fine-needle aspiration puncture biopsy (FNAB) was performed with cytological examination before the start of photodynamic therapy (PDT), and then on days 5, 10, and 30 after treatment. The biological preparation was fixed in Carnoy's fluid for 2 hours and embedded in paraffin. Sections 5-7 μm thick were stained by Papanicolaou. Histological examination was performed according to the standard method on paraffin sections stained with hematoxylin and eosin, picrofuchsin according to Van Gieson.

Statistical Analysis.The obtained digital data were subjected to statistical processing by methods of medical statistics. All calculations were carried out on the EXCEL-2016 and SPSS-24 spreadsheet. To assess the statistical significance of differences in the frequencies of the studied characteristics, a nonparametric χ^2 test was used. Differences were considered statistically significant at $p<0,05$. In each group of patients, the relative values of the analyzed parameters, their mean error (m), 95% confidence interval (±2m), and the significance of intergroup differences were calculated.

Results

The conducted retrospective study consists of 4 stages. At the outpatient (first) stage of the study, subclinical symptoms of autoimmune thyroid diseases were identified. Subjective data (anamnesis, complaints, intensity of clinical symptoms and syndromes, patient's assessment of quality of life) and objective data were analyzed to assess the presence or absence of signs of autoimmune thyroid diseases. The second stage was confirmation of the diagnosis of autoimmune thyroid disorders based on clinical and anamnestic data. Particular attention was paid to the data of ultrasound of the thyroid gland, cytological examination of punctates, and data of immunological, immunohistochemical, and histological studies of patients. The study of the cardiovascular system was carried out in all patients and included electrocardiography (ECG), if necessary, ABPM (24-hour blood pressure monitoring), echocardiography (EchoCG), and stress echocardiography. Based on clinical data, instrumental studies, and hormonal status, a complete clinical diagnosis of the disease was established. The third stage of the study is devoted to choosing optimal treatment tactics for autoimmune thyroid diseases based on a comparative analysis of the treatment results of patients with autoimmune thyroiditis.

In order to study the clinical and morphological features of autoimmune thyroid diseases and evaluate the clinical effectiveness of the treatment, a comparative analysis of subjective and objective data was performed to assess the presence or absence of signs of subclinical or overt hypothyroidism (intensity, manifestations, and severity of symptoms of the disease).

At the last stage of the study, the results of monitoring 442 (91,9%) patients who received various types of treatment in the clinic were analyzed. Long-term results of treatment were studied in 340 (70,7%) patients. According to the results of instrumental, laboratory, and morphological studies, a diagnostic search algorithm has been developed.

To assess the condition of patients in each of the three groups, we took into account a number of clinical symptoms and signs that were detected in patients during long-term follow-up. We studied the incidence of these syndromes in each of the three groups of patients (Figure1).

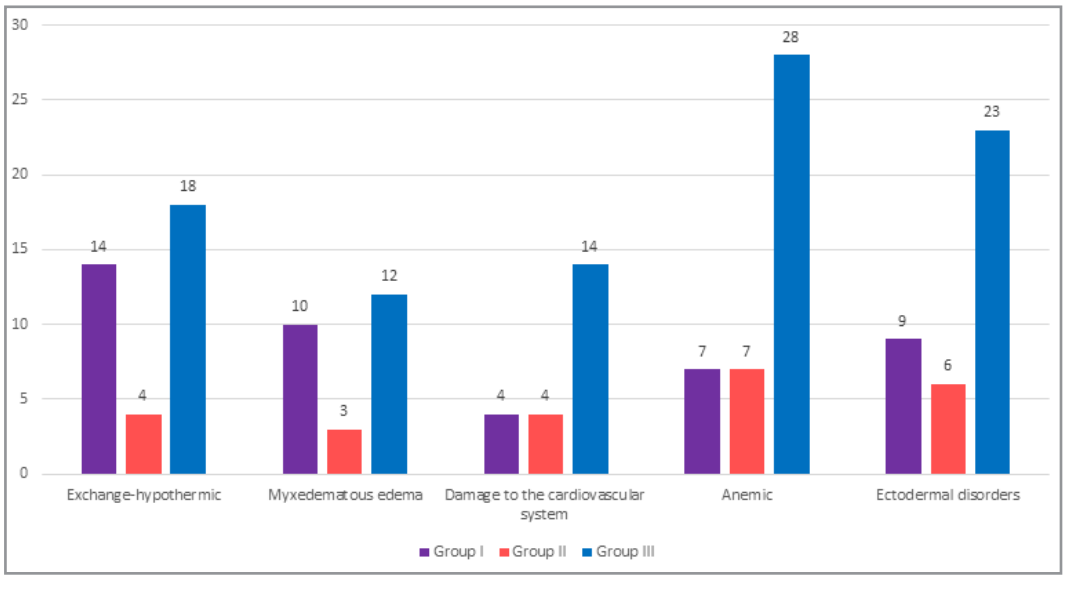

Figure 1.
The frequency of clinical syndromes in three groups of patients with autoimmune thyroid disease in the long term after various types of treatment

Analysis of the obtained data allowed us to note that among the total number of treated patients, hypothyroidism was detected in 101 (29,7%) of 340 patients followed. It should be emphasized that the number of patients with hypothyroidism is less than those who have certain clinical syndromes of hypothyroidism since two or more syndromes of this condition were observed in the same patient. In a comparative assessment of patients' conditions in groups, it was found that clinical signs of hypothyroidism were most often detected in people who underwent surgery - 62 (39,5%) of 157 patients followed. Among patients of group II, hypothyroidism was encountered with a lower frequency in 14 (17,5%) out of 80 patients followed, and among patients of group I, hypothyroidism was encountered in almost every fourth patient followed up in the long term - 25 (24,3%) out of 103 people. All patients with symptoms of hypothyroidism received maintenance therapy throughout the entire observation period.

Attention is drawn to the data on the nature of concomitant diseases that were detected in patients with autoimmune thyroid disease during examination in the clinic. A rather high incidence of comorbidities should be noted: hypertension in 250 (51,9%) and coronary heart disease in 226 (47,0%) patients. Diabetes mellitus, obesity, and chronic diseases of the gastrointestinal tract were diagnosed in every third patient. Diseases of the genitourinary and hematopoietic systems were detected least often. Most patients had a combination of two or more comorbidities. As a rule, this combination was accompanied by dysfunction of a number of important organs and systems and, in turn, affected the choice

of treatment tactics and the treatment results for patients.

The assessment of the quality of life showed that with adequately conducted conservative therapy, including substitution therapy, it remains at a satisfactory and good level in most patients. When assessing the quality of life, we used a questionnaire using a numerical 10-point scale, where the number 1 means “Absolutely dissatisfied”; 10 - “Very satisfied”; 5 - “Satisfied”; 0 - “Difficult to answer” in case of difficulty in answering the question. From the data in table 1, the majority of patients (290 (85,3%) out of 340 in all three groups) assess their quality of life as satisfactory or very good (Table 1).

Table 1.
Assessment of the quality of life in three groups of patients, taking into account the methods of treatment

Groups of patients	Number of patients	Score			
		1	5	10	0
I	103 (30,3%)	19 (18,4%)	60 (58,3%)	17 (16,5%)	7 (6,8%)
II	80 (23,5%)	7 (8,8%)	49 (61,3%)	20 (25,0%)	4 (5,0%)
III	157 (46,2%)	7 (4,4%)	94 (59,9%)	47 (29,9%)	9 (5,7%)
Summary of data	340 (100%)	33 (9,7%)	203 (59,7%)	84 (24,7%)	20 (5,9%)

Statistical processing of the data presented in table 1 using Pearson’s χ^2 method showed no significant difference in indicators between patients of groups I, II, and III in terms of overall scores: calculation separately for each score revealed the following values: by score - 1. Pearson’s χ^2 =10,4, p=0,025; by score - 5. χ^2=0,16, p=0,99; by score - 10. χ^2=6,0, p=0,05; by score - 0. χ^2=0,27, p=0,99; according to the joint assessment of points - 5. and 10. χ^2=10,9, p=0,025.

Currently, the main way to monitor and control the state of the thyroid residue in operated patients is ultrasound. In 202 operated patients, an analysis was made of the data of dynamic ultrasound examination, which was performed 1-3, 6-8, 12-14, 24-25 months after the operation. Residual thyroid tissue was found in 106 (52,4%) of 202 patients. In the remaining 96 people, the thyroid remnant could not be visualized: in 93 examined patients after thyroidectomy, in 1 (2,4%) of 42 followed-up patients after extremely subtotal resection of the thyroid gland, and in 2 (3,0%) of 67 followed-up patients after subtotal resection of the thyroid gland. thyroid resection. During dynamic monitoring of 106 patients in whom thyroid tissue was visualized. In operated patients, the hypertrophic type of change in the volume of the thyroid residue was most common - this variant was noted in 38 (35,8%) of 106 examined patients. An important criterion characterizing the state of the thyroid homeostasis system is the period of stabilization of the volume of the thyroid residue and the normalization of its structure (ultrasound examination of the parenchyma of the gland appears homogeneous and isoechoic, with normal vascularization). Stable throughout the entire period of observation, the volume of the thyroid residue was in 13 (12,3%) people. After 6-8 months. after surgery, his parenchyma was homogeneous and had normal vascularization in 3 (23,0%) patients.

To assess the state of hormonal homeostasis of patients in the late periods after treatment, we studied the concentration of thyroid hormones in a total of 150 patients, divided into three groups based on the treatment methods performed. According to the data presented in table 2, it can be noted that in each of the three groups of patients, hypothyroidism signs were observed (Table 2).

Table 2.
The concentration of thyroid hormones in the thyroid gland in the three groups in the late periods of observation

Groups of patients	Thyroid hormone levels		
	TSH mIU/ml n(0,27-4,2)	FT_4pmol/L n (12,0-22,0)	FT_3pmol/L n(3,1-6,8)
Igr.(n = 50)	6,4 [3,71-8,46]	8,9 [4,28-11,5]	2,1 [1,62-4,43]
IIgr.(n = 50)	5,7 [2,05-6,27]	9,4 [6,41-12,43]	2,8 [1,83-4,51]
IIIgr.(n = 50)	7,2 [4,25-9,15]	6,7 [3,92-10,13]	1,9 [1,24-2,87]

TSH: Thyroid-stimulating hormone; FT_4: Free thyroxine; FT_3: Free triiodothyronine

If in patients of group II these signs were not pronounced according to laboratory parameters and in mostpatientsthey corresponded to subclinical hypothyroidism, then in patients of groups I and III these signs are quite pronounced and were determined in high TSH levels and low levels of T_4 and T_3. In other words, if patients of group II showed signs of subclinical hypothyroidism with greater frequency, then in patients of groups I and III, deeper and more pronounced signs of clinical hypothyroidism were more

often observed. Analysis of the obtained data indicated that postoperative hypothyroidism was observed in all patients who underwent subtotal resection of the thyroid gland and thyroidectomy and in almost 1/3 of patients (32%) who received traditional conservative treatment. Given the presence of such changes, in fact, in every patient in all three groups of patients, we prescribed replacement therapy with levothyroxine. A study of the quality of life of patients showed that with adequate replacement therapy, it practically does not change.

The data shown in table 3 indicate that after 6-8 months, antibody titers are closest to normal in patients of group III, who underwent surgical treatment, and in patients of group II, who received photodynamic therapy in combination with sessions of intravenous laser blood irradiation with low-intensity laser radiation (ILBI-LILR) and conservative therapy. The slowest recovery of cellular immunity was observed in patients who received a course of conservative therapy in combination with sessions of ILBI-LILR (Table 3).

Antibody titer	I group 129 people examined		II group 106 people examined		III group 202 people examined	
	Anti-TG	Anti-TPO	Anti-TG	Anti-TPO	Anti-TG	Anti-TPO
Undetected	58 (45,0%)	39 (30,2%)	11 (10,4%)	32 (30,2%)	59 (29,2%)	162 (80,2%)
Low	38 (29,5%)	77 (59,7%)	64 (60,4%)	61 (57,5%)	120 (59,4%)	40 (19,8%)
High	33 (25,6%)	13 (10,1%)	31 (29,2%)	13 (12,3%)	23 (11,4%)	0

Table 3.
Indicators of antibody titer to TG and TPO in patients with autoimmune thyroiditis in the long term after the use of various methods of treatment

Anti-TG: anti-thyroglobulin; Anti-TPO: anti-thyroid peroxidase

With statistical processing of the data presented in table 3 used Pearson's χ^2 test. A statistical difference is observed between groups I, II, and III due to the indetermination of the Anti-TG titer (respectively, I and II - χ^2=73,1, p≤0,001; I and III χ^2=8,6, p≤0,010; II and III χ^2 =8,6, p≤0,010; II and III χ^2=14,0, p≤0,010). Due to the uncertainty of the titer of Anti-TPO, there are no statistical differences between group I and group II (χ^2=0, p≥0,050); Group III was statistically significantly different from groups I and II (χ^2=82,3, p≤0,001). Group Iisstatistically different from II (χ^2=22,6, p≤0,010) and III (χ^2=27,0, p≤0,010) groups in terms of low levels of Anti-TG titer, and there is no statistical difference between groups II and III (χ^2=0, p≥0,050). According to the low level of Anti-TPO, group III statistically significantly differs from group I (χ^2=54,0, p≤0,001) and II (χ^2=44,7, p≤0,001). There was no statistical difference between groups I and II (χ^2=0, p≥0,050).

According to the definition of a high level of Anti-TG titer, the indicators of group III are statistically significantly different from groups I and II (respectively, χ^2=11,1, p≤0,010; χ^2=15,3, p≤0,010). There was no statistical difference between groups I and II (χ^2=0,36, p≥0,050). There was no statistical difference in determining a high level of Anti-TPO titer between groups I and II (p>0,050).The study of the cellular link of immunity in patients with AIT showed that the most pronounced changes were observed in the population of T-lymphocytes, manifested by a change in the number of cells in subpopulations and a violation of their ratio. Studies have shown that an adequately performed operation in combination with a properly performed replacement therapy contributes to the normalization of immune parameters in most patients.

The need for immunological monitoring to assess the effectiveness of preoperative preparation and postoperative management of patients with autoimmune thyroiditis is confirmed by the fact that the appointment of an adequate dose of levothyroxine improves cellular immunity. Subsequent immunological examination showed a decrease in the titer of antibodies to thyroid peroxidase and thyroglobulin. Therefore, based on the data of the immunological examination, it is possible to judge the adequacy of the postoperative preparation and surgical treatment performed, as well as to identify a group of patients in whom autoimmune processes can progress in the thyroid residue, contributing to the development of postoperative recurrence of the disease or causing its atrophy.

Discussion

The available literature lacks data on the clinical course, a rational algorithm for the diagnostic data of patients with autoimmune thyroiditis. Despite the study of the main pathogenetic mechanisms, the diagnostic criteria and morphological changes in the thyroid glandduring AIT are still not clear enough. In order to study the clinical and morphological features of autoimmune thyroiditis and evaluate the clinical effectiveness of the treatment, an analysis of subjective and objective data was performed to assess the presence or absence of signs of subclinical or overt hypothyroidism. Based on the results of the study, we proposed a rational algorithm for diagnostic search. The developed algorithm is used in our clinic, which allows us to detect the presence of complications in the shortest possible time and determine the optimal tactics for treating patients with autoimmune thyroiditis.

Analysis of the data of clinical, instrumental, laboratory, and morphological studies suggests that in patients with diffuse nodular and diffuse pseudonodal forms of AIT, a complicated course of the disease is more often observed. For these forms, the characteristic features are the growth and enlargement of the thyroid gland. The progression of the disease leads to changes in the structure of the thyroid

gland, in which goiter changes occur (multiple foci of lymphoid and plasmacytic infiltration are formed), and locally a goiter (nodular or multinodular) is formed. In addition, clinically the disease is manifested by the development of overt hypothyroidism. We observed a similar course of the disease in 68,2% of patients with the diffuse-nodular form of AIT. In patients suffering from diffuse and atrophic forms of AIT, the clinical picture of the disease differs from that described. Complications in the form of goiter formation are rare, but hypothyroidism develops in these patients quite often. In our observations, such a course of the disease was detected in 20,3% of patients.

The limitations of the study include the lack of a single protocol dedicated to the problem of diagnosis and treatment of AIT. Despite the widespread prevalence of autoimmune thyroiditis and a long history of conservative therapy, the effectiveness of adequate treatment of AIT is relevant to this day. The disadvantage of the existing known drug therapy is its low efficiency, as well as the possibility of complications and recurrence of the disease. It is promising to create combined methods for the treatment of patients with diffuse autoimmune thyroiditis using laser photodynamic therapy and intravenous blood irradiation, which makes it possible to increase the effectiveness of the treatment by shortening the onset of a qualitative improvement in their condition, as well as reducing the number of complications and preventing the development of hypothyroidism.

Perspective directions for further research on the problem of diagnosis and treatment of AIT are developing a clear algorithm for the treatment of AIT using modern methods of treatment and studying the dynamics of the quality of life in patients with autoimmune thyroiditis.

Conclusions

1. The personalized approach to the diagnosis and treatment of patients with autoimmune diseases of the thyroid gland provides for the application of a complex of sequential actions in the form of the use of informative methods of diagnosis for the verification of the diagnosis (Fig. 1). The application of this algorithm allows you to determine the form of autoimmune diseases of the thyroid gland, the nature of its course, the characteristics of pathological changes in the thyroid gland, in neighboring organs and tissues, to exclude the tumor process and to choose a rational method of treating the patient.

2. The conducted analysis of clinical symptoms, ultrasound and morphological examination of patients with autoimmune diseases of the thyroid gland allows, with a high degree of reliability, to establish a precise diagnosis of the disease using a complex of modern diagnostic methods, which should represent an algorithm of actions.

3. Based on the results of the research, a rational algorithm for diagnostic search is developed. The proposed algorithm allows, on the basis of clinical, laboratory, immunological tests and instrumental examinations, to detect the presence of autoimmune thyroid diseases in the shortest possible time and to determine the optimal treatment tactics for patients with autoimmune thyroiditis.

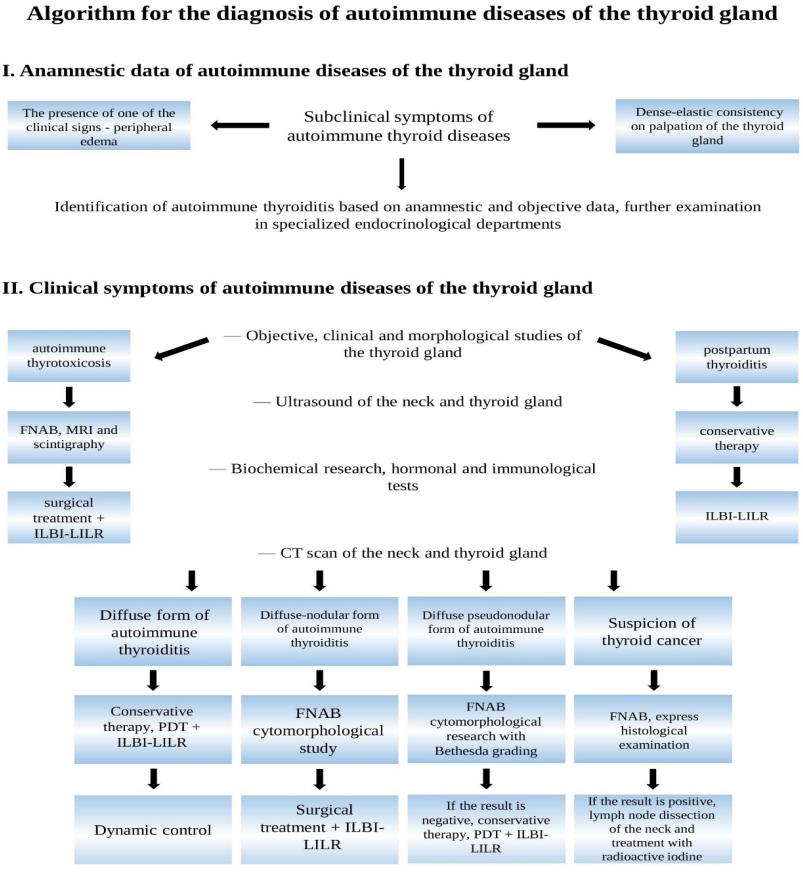

Figure 1.
Algorithm for the diagnosis of autoimmune diseases of the thyroid gland.
ILBI: intravenous laser blood irradiation;
LILR: low-intensity laser radiation;
PDT: photodynamic therapy;
FNAB: fine-needle aspiration puncture biopsy;
MRI: Magnetic resonance imaging;
CT: computed tomography

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PROPHYLAXIS WITH RIVAROXABAN OF CATHETER ASSOCIATED THROMBOSIS IN CANCER PATIENTS (CAT-RIVA TRIAL): MAIN DATA AND INTERMEDIATE RESULTS OF PROSPECTIVE MULTICENTER STUDY

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Conflict of interest
The authors declare that they have no conflicts of interest

Keywords:
central venous catheter, CVC, central venous catheter-associated thrombosis, central venous catheter-associated deep vein thrombosis, CAT, catheter-related thrombosis, CRT, culmonary embolism, PE, cancer.

Abstract

Central venous catheters (CVCs), such as the tunneled catheters and the totally implanted ports, play a major role in general medicine and oncology. Thrombosis associated with CVCs is a common complication in cancer patients. Thus, in order to more widely study the problem of catheter-associated thrombosis in cancer patients, we initiated a study for 2022-2023 within one region.

Purpose. *Evaluation of the efficacy and safety of thromboprophylaxis of catheter-associated thrombosis with rivaroxaban in cancer patients.*

Material and methods. *Prospective multicenter study, conducted since 01/05/2022 and planned to be completed by the end of 2022, on the basis of three centers. The subjects are divided into 2 groups to randomize 60 participants in each. The first group: receive DOACs (rivaroxaban) at a dosage of 20 mg per day the day before the inserting of the CVC. Second group: treatment of the underlying disease without the use of DOACs.*

Results. *None of the patients developed submassive or massive pulmonary embolism. There were no cases of CAT in the thromboprophylaxis group compared to the non-thrombotic prophylaxis group (0% vs 15.7%). The relative risk of developing CAT is 0.86, which indicates the effectiveness of thromboprophylaxis with rivaroxaban.*

Conclusion. *Our interim results show the efficacy of rivaroxaban at a dosage of 20 mg per day in cancer patients. The final results are planned to be published at the end of the study.*

Қатерлі ісікпен ауыратын науқастарда катетермен байланысты тромбоздың ривароксабанмен алдын алу (cat-riva сынағы): негізгі деректер және перспективалық көп орталықты зерттеудің алғашқы нәтижелері

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Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Түйін сөздер:
орталық веноздық катетер, CVC катетерімен байланысты тромбоз, катетермен байланысты терең вена тромбозы, CAT, өкпе эмболиясы, ПЭ, онкология.

Аңдатпа

Люменді катетер және имплантацияланған хемопорт сияқты орталық венозды катетерлер (ОВК) жалпы медицинада және онкологияда маңызды рөл атқарады. ОВК-мен байланысты тромбоз онкологиялық науқастарда жиі кездесетін асқыну болып табылады. Осылайша, онкологиялық науқастарда катетер-тромбоз ассоциялануы (КТА) мәселесін кеңірек зерттеу үшін біз бір аймақта 2022-2023 жылдарға арналған зерттеуді бастадық.

Мақсаты. *Қатерлі ісікпен ауыратын науқастарда ривароксабанмен катетермен байланысты тромбоздың тромбопрофилактикасының тиімділігі мен қауіпсіздігін бағалау.*

Материал және әдістер. *Үш орталыққа негізделген проспективті көп орталықты зерттеу 01/05/2022 бастап жүргізілуде және оны 2022 жылдың соңына дейін аяқтау жоспарлануда. Науқастар әрқайсысы 60 адамнан 2 топқа бөлінеді. Бірінші топ: ОВК орнатудан бір күн бұрын күніне 20 мг дозада*

ПОАК (ривароксабан) қабылдайтын емделушілер. Екінші топ: ПОАК қолданбай негізгі ауруды емдеу.

Нәтижелер. *Науқастардың ешқайсысында субмассивті немесе массивті өкпе артериясының тромбоэмболиясы болмаған. Тромбопрофилактикасы жоқ топпен салыстырғанда (0% қарсы 15,7%) тромбопрофилактика тобында КТА жағдайлары байқалмады. КТА дамуының салыстырмалы қаупі 0,86 құрайды, бұл ривароксабанмен тромбопрофилактиканың тиімділігін көрсетеді.*

Қорытынды. *Біздің зерттеуіміздің аралық нәтижелері онкологиялық науқастарда тәулігіне 20 мг дозада ривароксабанның тиімділігін көрсетеді. Соңғы нәтижелерді зерттеудің аяғына дейін жариялау жоспарлануда.*

Профилактика ривароксобаном катетер-ассоциированных тромбозов у онкологических больных (исследование cat-riva): основные данные и промежуточные результаты проспективного многоцентрового исследования

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Аннотация

Центральные венозные катетеры (ЦВК), такие как просветные катетеры и имплантированные хемопорты, играют важную роль в общей медицине и онкологии. Тромбоз, ассоциированный с ЦВК, является частым осложнением у онкологических больных. Таким образом, для более широкого изучения проблемы катетер-ассоциированных тромбозов (КАТ) у онкологических больных нами было инициировано исследование на 2022-2023 годы в рамках одного региона.

Цель. *Оценка эффективности и безопасности тромбопрофилактики катетер-ассоциированных тромбозов ривароксабаном у онкологических больных.*

Материалы и методы. *Проспективное многоцентровое исследование на базе трех центров, проводитсяс 05.01.2022 г. и планируется к завершению к концу 2022 года. Испытуемых делят на 2 группы по 60 человек в каждой. Первая группа: пациенты, принимающие ПОАК (ривароксабан) в дозе 20 мг в сутки за день до установки ЦВК. Вторая группа: лечение основного заболевания без применения ПОАК.*

Результаты. *Ни у одного из пациентов не развилась субмассивная или массивная тромбоэмболия легочной артерии. Случаев КАТ в группе тромбопрофилактики не было по сравнению с группой без тромбопрофилактики (0% против 15,7%). Относительный риск развития КАТ составляет 0,86, что свидетельствует об эффективности тромбопрофилактики ривароксабаном.*

Заключение. *Промежуточные результаты нашего исследования показывают эффективность ривароксабана в дозе 20 мг в сутки у онкологических больных. Окончательные результаты планируется публиковать к концу исследования.*

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Ключевые слова:
центральный венозный катетер, ЦВК катетер-ассоциированный тромбоз, катетер-ассоциированный тромбоз глубоких вен, КАТ, тромбоэмболия легочных артерий, ТЭЛА, онкология

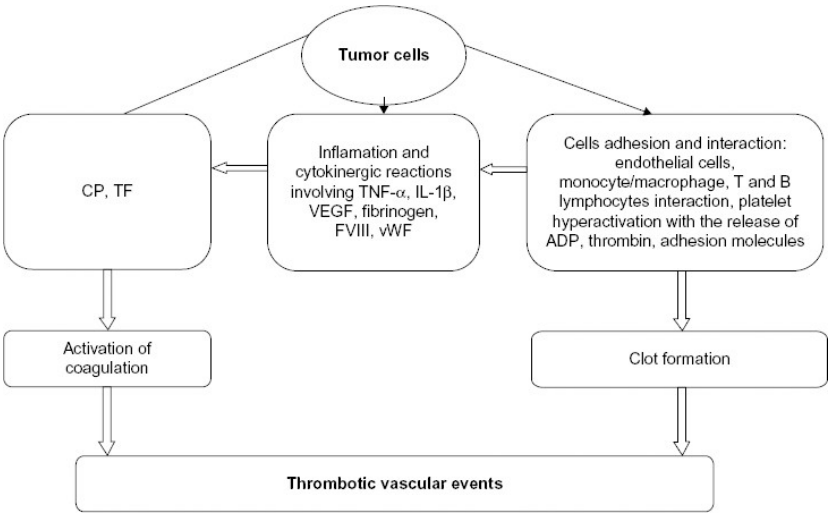
Introduction

Central venous catheters (CVCs), such as the tunneled catheters and the totally implanted ports, play a major role in genera lmedicine and oncology. Aside from the complications (pneumothorax, hemorrhage) associated with their initial insertion, all of these CVCs are associated with the long-term risks of infection and thrombosis [1].

Thrombosis associated with CVCs is a common complication in cancer patients. Most CVC thrombosis will occur within 30 days after placement, with a majority within 8 days. The incidence may depend on the type of CVC and location of the catheter tip. [2].

The pathophysiology of cancer-associated thrombosis is not entirely understood. The hypercoagulable state in cancer involves several complex interdependent mechanisms (Figure 1), including interaction among cancer cells, host cells, and the coagulation system [3]. The presence of tumor cells induces a hypercoagulable state. More recently, novel risk factors, including platelet and leukocyte counts and tissue factor (TF), are associated with high risk of venous thromboembolism (VTE), in cancer patients [12]. Furthermore, cancer-associated thrombosis is linked with poor prognosis, and it is the second leading cause of death in cancer patients [3].

Figure 1. Factors involved in cancer-associated thrombosis



Abbreviations: CP, Cancer procoagulant; TF, Tissue factor; TNF-α, Tumor necrosis factor-α; IL-1β, Interleukin-1β; VEGF, Vascular endothelial growth factor; FVIII, Factor VIII; vWF, Von Willebrand factor; ADP, Adenosine diphosphat.
Source: Karimi M, Cohan N. Cancer-Associated Thrombosis. *The Open Cardiovascular Medicine Journal* 2010;4:78–82.

Typical symptoms associated with catheter-associated thrombosis include swelling, discomfort and erythema of the involved extremity. The presence of both pain and swelling has been shown to be more predictive of a thrombus than either symptom in isolation. However, several studies examining prevalence of catheter-associated thrombosis by screening ultrasound suggest that a high percentage of patients with catheter-associated thrombosis are asymptomatic [5]. Ultrasound imaging has many advantages, including good sensitivity and specificity, low risk due to absence of radiation or contrast exposure, low cost and high accessibility [5]. Catheter-associated thrombosis (CAT) may lead to pulmonary embolism and infection, as well as catheter failure and potential delays in treatment. The vast majority of CAT are asymptomatic, thus a high index of suspicion is required in making the diagnosis. Doppler ultrasound or venography may be employed to identify CAT [6].Cancer patients have a high central venous catheter-related thrombosis risk perioperatively despite prophylactic anticoagulation. Color Doppler sonography is a rapid and noninvasive technique and it is accurate in the diagnosis of venous thrombosis. Early detection of venous thrombosis is important to prevent the systemic and fatal complication of the thrombosis [7].

Recently, the development of direct oral anticoagulants (DOACs) that directly inhibit factor Xa (eg, rivaroxaban, apixaban, or betrixaban) or thrombin (for example, dabigatran etexilate) is a milestone achievement in the prevention and treatment of VTE [8]. Despite recommendations against the use of systemic anticoagulation for prophylaxis against CVC thrombosis, a potential role continues to be explored in selected settings [8]. The risk of venous thromboembolism recurrence in patients whose central venous catheter has been pulled out and cancer is in remission appears low following anticoagulation discontinuation and after a minimum of 3 months of full/intermediate dose [9]. M. Levine et al noted about novel antithrombotic agents that can be administered orally and do not require laboratory monitoring [8].

Rivaroxaban showed promise in treating central venous catheter-related, upper extremity deep venous thrombosis (CVC-UEDVT) in cancer patients, resulting in preserved line function. However, bleeding rates and a fatal pulmonary embolism on treatment are concerning safety outcomes necessitating further study before rivaroxaban can be recommended [10]. Overall the safety and efficacy of rivaroxaban use in patients with active cancer for treatment of central venous catheters associated upper extremity deep venous thrombosis is very favorable in this single institutional cohort. Nevertheless, randomized controlled trials are needed to confirm these results [11].

Thus, in order to more widely study the problem of catheter-associated thrombosis in cancer patients, we initiated a study for 2022-2023 within one region.

Purpose

Evaluation of the efficacy and safety of thromboprophylaxis of catheter-associated thrombosis with rivaroxaban in cancer patients.

Materials and methods

Prospective multicenter study, conducted since 01/05/2022 and planned to be completed by the end of 2022, on the basis of three centers: “Private Clinic Almaty”, JSC “National Scientific Center of Surgery named after A.N. Syzganov”, “Almaty Cancer Center”. The study included patients aged 18-90 years with malignant neoplasms of the breast with inserted central venous catheter (CVC).

The subjects are divided into 2 groups to randomize 60 participants in each (Figure 2).The first group: receive DOACs (rivaroxaban) at a dosage of 20 mg per day the day before the installation of the CVC. Second group: treatment of the underlying disease without the use of DOACs.

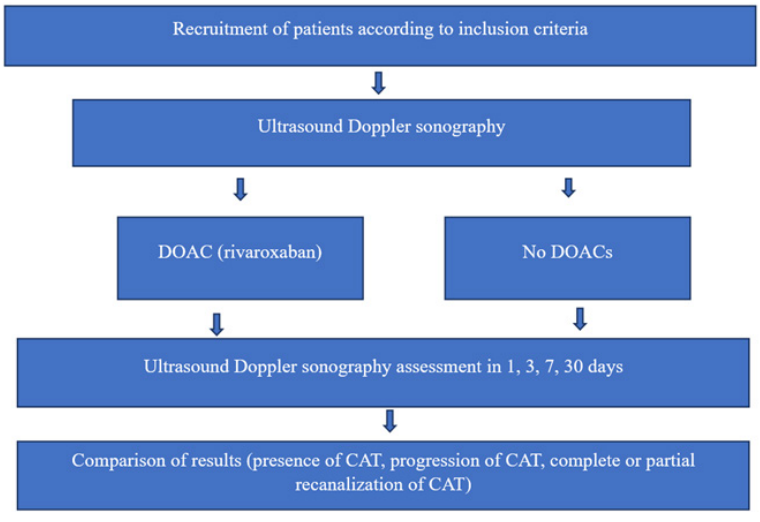


Figure 2.
Design and algorithm of the study

All subjects undergo ultrasound Doppler sonography, D-dimer and routine laboratory tests. The main exclusion criteria are: patients with severe comorbidities, previously receiving of any anticoagulants, patients with GFR<15 ml/min, patients receiving hormonal drugs, patients in the early postoperative period.

Results

During the study period, as of November 1, 2022, 38 patients were randomized, 19 patients in each group, average age 48.3 years. None of the patients developed submassive or massive pulmonary embolism. There were no cases of CAT in the thromboprophylaxis group compared to the non-thrombotic prophylaxis group (0 vs 15.7) (Figure 3, Figure 4A, 4B). The relative risk of developing CAT is 0.86, which indicates the effectiveness of thromboprophylaxis with rivaroxaban.

The risk of venous thromboembolism recurrence in patients whose central venous catheter has been pulled out and cancer is in remission appears low following anticoagulation. From the moment of detection of CAT, patients were prescribed anticoagulants (rivaroxaban) at a therapeutic dosage. In one case, a patient with total occlusion of the internal jugular and subclavian veins had edema of the upper limb for four months, partial recanalization of the thrombus (more than 50%) was recorded on the third month. None of the patients had episodes of “major” bleeding (more than 500 ml) (Table 1).

	Prophylaxis	No Prophylaxis
Number of patients	19	19
Median age	50,1 y	48,9 y
Asymptomatic CVC-associated thrombosis	0	2
Symptomatic CVC-associated thrombosis	0	1
Major bleeding	0	0
Pulmonary embolism	0	0
Posttrombotic syndrome	0	1
Death	0	0

Table 1.
Features of groups with and without thromboprophylaxis

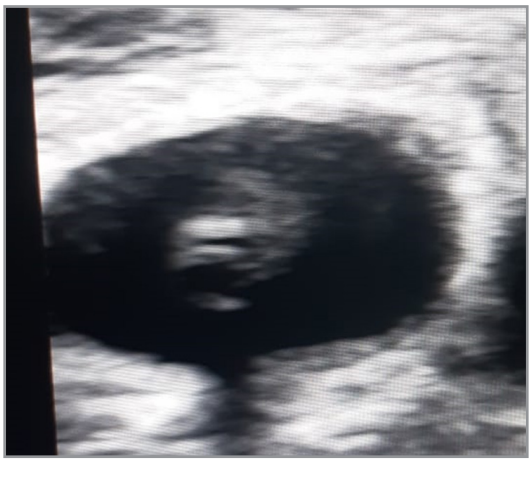
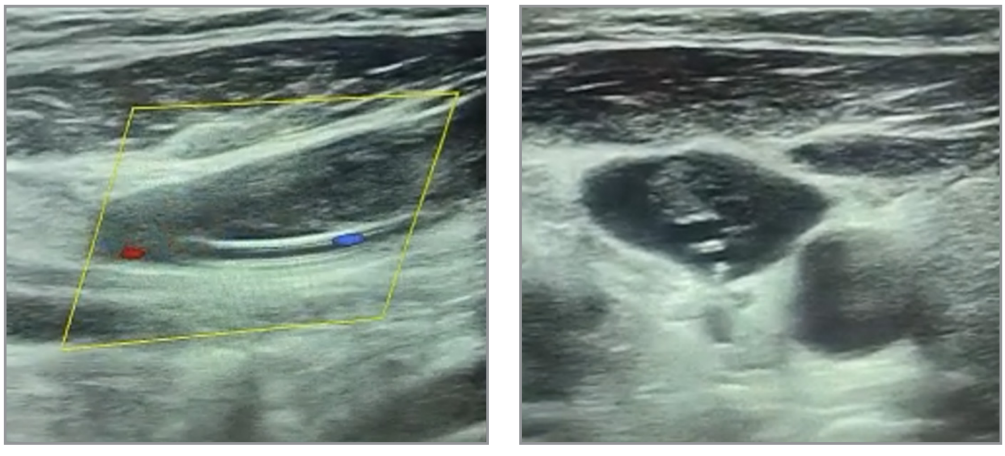


Figure 3.
Thrombosis of CVC in the group without thromboprophylaxis (3rd day)

Figure 4 A,B. Thrombosis in the internal jugular vein in the group without thromboprophylaxis (7th day)



Conclusion

Patients with active cancer are at high risk of central venous catheter-associated thrombosis risk. Our interim results show the efficacy of rivaroxaban at a dosage of 20 mg per day in this category of patients. Ultrasoud doppler sonography is a rapid and noninvasive technique and it is accurate in the diagnosis of venous thrombosis. Currently, the use of DOACs is limited to a rather narrow range of indications, so further randomized controlled trials are needed. The final results are planned to be published at the end of the study.

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ASIAN TRANSPLANTATION WEEK 2022, СЕУЛ, ЮЖНАЯ КОРЕЯ

17-19 ноября 2022 года состоялся Международный Конгресс AsianTransplantation Week 2022 в городе Сеул, Южная Корея. В работу Конгресса были включены следующие секционные заседания: забор фрагментов печени у доноров, гепатэктомия у реципиентов и имплантация, развитие и оптимизация предоперационной подготовки, послеоперационное введение пациентов и отдаленные результаты лечения, улучшение отдаленных результатов после трансплантации печени, развитие трансплантации печени в Азиатских странах, технические сложности при трансплантации печени, а также заседания по трансплантации почек, поджелудочной железы, сердца и легких.

На Конгрессе присутствовало около 300 участников со всего мира, были представлены 280 устных и 90 постерных докладов от ведущих специалистов в области трансплантологии. С устным докладом на тему: «How to Start and Establish New LDLT Program in Asian Countries. Kazakh experience» выступил Председатель Правления АО «ННХЦ им. А.Н. Сызганова», д.м.н., профессор, академик НАН РК Баймаханов Б.Б., который поделился клиническим и научным опытом реализации программы трансплантации печени от живого донора на примере Казахстана. Доклад был воспринят с большим интересом.

ТРЕБОВАНИЯ ДЛЯ АВТОРОВ ЖУРНАЛА «ВЕСТНИК ХИРУРГИИ КАЗАХСТАНА»

Уважаемые авторы!

С 1 апреля 2018 года все статьи на публикацию принимаются на государственном или русском языках с обязательным переводом всей статьи на английский язык. Статьи без версии на английском языке будут отклонены.

Также учитывая требования Консультативной Комиссией (CSAB) Scopus об интернационализации авторов и аудитории редколлегия журналов рекомендуют публиковать статьи в соавторстве с учеными дальнего и ближнего зарубежья.

В журнале публикуются научные статьи и заметки, экспресс-сообщения о результатах исследований в различных областях естественно-технических и общественных наук.

Решение о публикации принимается редакционной коллегией журнала после рецензирования, учитывая научную значимость и актуальность представленных материалов. Статьи, отклоненные редакционной коллегией, повторно не принимаются и не рассматриваются. Рукописи, оформленные не по правилам, возвращаются авторам без рассмотрения.

Рукопись направляется на отзыв члену редколлегии и одному из указанных рецензентов; в спорных случаях по усмотрению редколлегии привлекаются дополнительные рецензенты; на основании экспертных заключений редколлегия определяет дальнейшую судьбу рукописи: принятие к публикации в представленном виде, необходимость доработки или отклонение. В случае необходимости рукопись направляется авторам на доработку по замечаниям рецензентов и редакторов, после чего она повторно рецензируется, и редколлегия вновь решает вопрос о приемлемости рукописи для публикации. Переработанная рукопись должная быть возвращена в редакцию в течение месяца после получения авторами отзывов; в противном случае рукопись рассматривается как вновь поступившая. Рукопись, получившая недостаточно высокие оценки при рецензировании, отклоняется как не соответствующая уровню или профилю публикаций журнала.

Авторы несут ответственность за достоверность и значимость научных результатов и актуальность научного содержания работ. Не допускается **ПЛАГИАТ** – умышленно совершаемое физическим лицом незаконное использование чужого творческого труда, с доведением до других лиц ложных сведений о себе как о действительном авторе.

Редакция принимает на рассмотрение рукописи только на английском языке, присланные через официальный сайт журнала **www.vhk.kz.**

Материал статьи – абстракт на казахском, русском и английском языках, список литературы, рисунки, подписи к рисункам и таблицы, оформляется одним файлом; дополнительно каждый рисунок оформляется в виде отдельного файла. Если пересылаемый материал велик по объему, следует использовать программы для архивирования. Все страницы рукописи, в том числе таблицы, список литературы, рисунки и подписи к ним, следует пронумеровать.

Представленные для опубликования материалы должны удовлетворять следующим требованиям:

1. Содержать результаты оригинальных научных исследований по актуальным проблемам в области физики, математики, механики, информатики, биологии, медицины, геологии, химии, экологии, общественных и гуманитарных наук, ранее не опубликованные и не предназначенные к публикации в других изданиях. Статья сопровождается разрешением на опубликование от учреждения, в котором выполнено исследование.
2. Размер статьи 7-10 страниц (статьи обзорного характера – 15-20 стр.), включая аннотацию в начале статьи перед основным текстом, которая должна отражать цель работы, метод или методологию проведения работы, результаты работы, область применения результатов, выводы (аннотация не менее 20 предложений (150»300 слов) - (на английском языке) через 1 компьютерный интервал), таблицы, рисунки, список литературы (через 1 компьютерный интервал, размер шрифта – 14), напечатанных в редакторе Word, шрифтом Times New Roman, поля – верхнее и нижнее – 2 см, левое –3 см, правое –1,5 см. Количество рисунков – 5-10.

Структура должна соответствовать международной формуле IMRAD, где I – introduction (вступление), M – Methods (методы), R – Results (исследование), A – и, D – conclusion+ discussion (заключение, обсуждение результатов и выводы).

Название • Отображает суть работы • Краткое • Без аббревиатур.

Необходимо официально закрепить название организации на английском и сокращение

Резюме • Структурировано • Без аббревиатур • Передает структуру статьи – Зачем (актуальность) – Какими методами?

– Что получено – Как это изменило картину знаний. Именно его читают в первую очередь, только хорошее резюме может привлечь внимание!

Вступление • Актуальность работы • Какая задача поставлена • Почему

Методы • Перечисление • Если известные - дать ссылку

Если модифицировали – указать как • Описывать так что б могли повторить • Статистика!

Результаты • Допускается не хронологическое, а логическое повествование • Основные, а не все что были сделаны • Иллюстрируются минимально необходимыми сводными данны- ми (исходные могут быть в дополнительных материалах)

Обсуждения • Не повторять результаты • Сопоставить полученные данные с имеющимися • Обсудить возможные причины и следствия

Функции списка литературы: • Аргументировать идею • Сопоставить с существующими аналогами • Обозначить место данного исследования • Избежать плагиата • Для журнала и ученого = признание • Часто указаны только собственные работы или очень старые (самоцитирование допускается только 10-15% от общего списка литературы) • Кочующие ошибки

Различайте • Ссылки • Список литературы • Библиография Что

могут цитировать • Книги, (монографии, главы) • Статьи научных журналов • Материалы конференций • Патенты • Диссертации • Неопубликованные данные • СМИ • Веб ресурсы (протоколы, веб странички) Источник должен быть надежным и легко доступным.

Статья начинается на английском языке. В начале, посередине страницы, идет название статьи прописными жирными буквами, название статьи должно быть коротким и емким, согласно проведенного анализа около 30-40 символов на английском языке.

Далее на следующей строчке – инициалы и фамилии авторов обычным жирным шрифтом, затем на следующей строчке – название организации(ий), в которой выполнена работа, город, страна, затем на новой строчке – адреса E-mail авторов. С красной строки идут ключевые слова **(Key words)**, а на новой строчке – сама аннотация (**Abstract** – не менее **150** и более **300** слов).

Далее, после отбивки одной строки, начинается на русском языке. В начале статьи вверху слева следует указать индекс **УДК, МРНТИ.**

Затем, посередине страницы, пишется: 1) название статьи; авторы; 3) название организации; с красной строки – **Ключевые слова,** затем – **Аннотация** (оформление шрифтов, как на английском языке).

Отбиваем одну строку и начинается сама статья. Следом за статьей идет список **Литературы.** Ссылки на литературные источники даются цифрами в прямых скобках по мере упоминания (не менее 20).

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Статья в международном журнале:

1. Campry TS, Anders T. (1987) SNAP receptors implicated in vesicle targeting and fusion, Environ Pollut, 43:195-207. DOI: 10.1016/0269-7491(87)90156-4 (in Eng)

Статья в русскоязычном журнале, не имеющая англоязычной версии:

2. Ivanova TV, Samoilova NF (2009) Electrochemical Energetics [Elektrohimicheskaya energetika] 9:188-189. (In Russian)

Книги:

Timrat TA (2008) Soil pollution: origins, monitoring and remediation, second edition. Springer, Germany. ISBN: 978-3- 540-70777-6

Материалы конференции:

Monin S.A. (2012) Treatment techniques of oil-contaminated soil and water aquifers. Proceedings of International Conference on Water Resources and Arid Environment, Riyadh, Saudi Arabia. P.123.

Патенты:

Barin AB, Mukamedzhan NT (2000) A method for determination of 1,1-dimethylhydrazine and nitrosodimethylamine [Metodopredeleniya 1,1-dimetilgidrazina initrosodimetilamina]. Preliminary Patent of the Republic of Kazakhstan [Predvaritelnyi patent Respubliki Kazakhstan]. (In Russian)

Стандарты, ГОСТы:

RMG 61-2003. Indexes of accuracy, precision, validity of the methods of quantitative chemical analysis, methods of evaluation [GSI.Pokazatelitochnosti, pravilnosti, retsizionnosti metodik kolichestvennogo himicheskogo analiza. Metodyiotsenki]. Moscow, Russia, 2003. (In Russian)

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