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EVALUATION OF PUNCTURE DRAINING INTERVENTIONS EFFICACY IN PATIENTS WITH PANCREATIC FLUID COLLECTIONS*

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Мета дослідження – оцінити ефективність пункцій та дренувань під контролем УЗД у пацієнтів з скупченнями рідини (СР) за гострого панкреатиту (ГП). Проаналізовані результати обстеження та лікування 72 пацієнтів з обмеженими СР за ГП, яким проведене лікування з використанням *step-up* підходу в період з 2010 по 2018 роки. Пацієнти були розділені на дві групи: До I групи включено 40 пацієнтів, яким в якості першого етапу лікування виконані дренування обмежених СР під контролем УЗД. До II групи включено 32 пацієнта яким в якості першого етапу лікування виконані пункції та дренування обмежених СР під контролем УЗД. У більшості пацієнтів I групи (65,0%) відзначали гострі постнекротичні скупчення рідини. У 30 (75,0%) пацієнтів дренування СР під контролем УЗД було остаточним в лікуванні. У 10 (25,0%) пацієнтів з інфікованими гострими постнекротичними СР після дренування під контролем УЗД та аспірації рідинного компоненту виконана некрсеквестректомія. В II групі у більшості пацієнтів (62,5%) також відзначали гострі постнекротичні скупчення рідини. 17 пацієнтам виконана пункція СР під контролем УЗД та аспірація вмісту. 15 пацієнтам виконані дренування гострих постнекротичних СР під контролем УЗД в зв'язку з наявністю ознак інфікування. У 11 (73,3%) з них дренування СР під контролем УЗД було остаточним в лікуванні, 4 (26,7%) – потребували виконання некрсеквестректомії. В II групі у 81,2% пацієнтів мінімально-інвазивні оперативні втручання були остаточними в лікуванні. Ознаки синдрому системної запальної відповіді (ССЗВ) відзначали як у пацієнтів з асептичними СР, так і у пацієнтів з інфікованими СР. У пацієнтів за гострого панкреатиту з тривалістю захворювання до 4 тижнів наявність ССЗВ не є специфічною ознакою лише інфікування. Лікувально-діагностична пункція СР під контролем УЗД є безпечним методом, що сприяє своєчасній діагностиці інфікованих СР. При наявності асептичних гострих парапанкреатичних СР та асептичних гострих постнекротичних СР пункція під контролем УЗД з аспірацією може знизити частоту виникнення гнійно-септичних ускладнень та бути остаточною в лікуванні. Інфіковані СР без ознак нагноєння не потребують рутинного дренування. Дренування абсолютно показане при наявності гнійного вмісту та при стійкому ССЗВ у пацієнтів після попередньої пункції інфікованих СР.

Ключові слова: гострий панкреатит, скупчення рідини, пункція, дренування.

The aim of the research is to evaluate the effectiveness of ultrasound guided punctures and drainage for FCs in AP. The results of the examination and treatment of 72 patients with FCs in AP who have been treated using step up approach in the period from 2010 till 2018 are analyzed. Patients were divided on two groups: The first group included 40 patients, who underwent draining of FCs under ultrasound guidance as a first stage of treatment. The second group included 32 patients, who underwent puncture of FCs under ultrasound guidance as the first stage of treatment. In the majority of patients in Group I (65.0%) we observed acute post-necrotic FCs. In 30 (75.0%) patients draining under ultrasound guidance was final in treatment. 10 (25.0%) patients with infected acute postnecrotic FCs, after drainage and aspiration underwent necrectomy. In most of patients of group II (62.5%) were noted acute postnecrotic FCs too. 17 patients underwent ultrasound guided puncture and aspiration of FCs. 15 patients of group II underwent drainage of acute post-necrotic FCs under the ultrasound guidance. In 11 (73.3%) of them the drainage of FCs was definitive in treatment, 4 (26.7%) - required the necrosectomy. In group II, in 81.2% patients minimal invasive surgical interventions were effective. SIRS was noted as in patients with aseptic FCs so in patients with infected FCs. In patients with acute pancreatitis, the duration of the disease up to 4 weeks, as well as the presence of SIRS, is not a specific sign of infection only. Ultrasound-guided diagnostic puncture of FCs is a safe method that facilitates early diagnosis of infected FCs. Ultrasound guided puncture with aspiration can reduce the incidence of purulent-septic complications and be definitive in treatment for aseptic acute parapancreatic FCs and aseptic acute post-necrotic FCs. Infected FCs without suppuration do not require routine drainage. Drainage is absolutely indicated in case of purulent content and persistent SIRS in patients after primary puncture of infected FCs.

Key words: acute pancreatitis, fluid collections, puncture, drainage.

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Early diagnostics and treatment of acute pancreatitis (AP) is one of the most important issues of modern urgent surgery [5]. The mortality rate for severe AP still remains rather high. Treatment approach for AP has undergone significant changes over the past decades. Now indications for surgical treatment are purulent complications and in case of absence of infection most of surgeons prefer conservative treatment [2, 4]. Randomized studies have shown that the use of antibiotics for necrotizing pancreatitis can prevent development of purulent complications but it is not accompanied by elevation of the "survival" of patients [4]. Ultrasonography and computer tomography (CT) give an opportunity to differentiate fluid collection (FC) from necrotic tissue but do not provide differentiation between sterile and infected process [7]. Surgeons have modern laboratory and instrumental methods of examination but there is no clear diagnostic algorithm that would determine a sufficient minimum, sequence, informativeness in detection of infection in necrotized tissues and FC for the purpose of determining treatment approach. According to the recommendations of American College of Gastroenterologists infected FC after four weeks of the onset of the disease is indication for intervention and it can be draining under ultrasound or CT guidance. But authors do not provide clear recommendations for surgical approach for infected FC up to four weeks from the onset of the disease [2, 4]. Among the insufficient studied issues in treatment of AP, methods and terms of surgical interventions for FC so-called early and late, sterile and infected, localized in bursa omentalis or retroperitoneal space [1, 3, 6, 8]. Criteria for diagnostics for FCs in the early term of AP, term of puncture and drainage are still discussed.

The aim of the research is to evaluate the effectiveness of ultrasound guided punctures and drainage for FCs in AP.

Material and methods

The results of the examination and treatment of 72 patients with FCs in AP who have been treated using step up approach in the period from 2010 till 2018 are analyzed. There were 47 (65,2%) men and 25 (34,8%) women. The age of the patients ranged from 25 to 81 years old. All patients were admitted to hospital in period of more than 24 hours after the onset of disease. In this study patients with acute parapancreatic and acute postnecrotic FCs are included.

The evaluation of nature of pathological changes in AP and the effectiveness of treatment was performed on the basis of clinical, laboratory data, ultrasound diagnostics, computer tomography, magnetic resonance imaging, X-ray contrast study. The severity of patient's status was assessed by the APACHE II and Marshall scales.

Patients were divided on two groups:

The first group included 40 patients, who underwent draining of FCs under ultrasound guidance as a first stage of treatment.

The second group included 32 patients, who underwent puncture of FCs under ultrasound guidance as a first stage of treatment.

Indications for initial performing of puncture or draining of FCs under ultrasound guidance were systemic inflammatory response syndrome (SIRS), compression, and signs of infected FCs on image. Puncture and draining were performed using the apparatus "Logiq C 5" (GE) and Ultima SMR (Radmir). The groups were compared

by the age of the patients and the severity of status of patients.

Results and discussion

The following characteristics of FCs as localization, size, shape, borders, structure, and the presence and spreading of pancreatogenic infiltrative changes were assessed in the course of ultrasound diagnostics.

In the first group, the SIRS was noted in 24 (60.0%) patients, the signs of infection on image - in 10 (25.0%), signs of compression - in 14 (35.0%). FCs were localized in one department of abdomen in 20 (50.0%) patients, in two departments - in 16 (40.0%), in three departments - in 4 (10.0%). In 36 (90.0%) patients the FCs had irregular shape, and in 28 (70.0 %) patients the FCs had irregular borders. The size of FCs was 5-10 cm in 19 (47,5%) patients, more than 10 cm in 21 (52,5%). The structure of FCs was homogeneous in 14 (35.0%) patients, heterogeneous due to the presence of tissue - in 21 (52.5%), and heterogeneous due to the presence of the tissue and gas - in 5 (12.5%). The presence of pancreatogenic infiltrate was noted in all patients. Thus, in the majority of patients in Group I (65.0%) we observed acute postnecrotic FCs.

In the course of draining of FCs under ultrasound guidance, we assessed content of FCs. Based on the characteristics of content of FCs, the results of microscopic and bacteriological study, content of FCs was divided into aseptic, infected and purulent. Aseptic content was noted in 20 (50.0%) patients, infected - in 17 (42.5%), purulent - in 3 (7.5%).

In 30 (75.0%) patients was noted regression of signs of compression and SIRS after draining of FCs. In the course of dynamic ultrasound, FCs did not visualized, and we observed a tendency of gradual decrease of pancreatogenic infiltrate spreading. In these patients, draining under ultrasound guidance was final in treatment. Among these patients: 10 (25.0%) patients with aseptic acute parapancreatic FCs, 4 (10.0%) - with infected acute parapancreatic FCs, 10 (25.0%) - with aseptic acute postnecrotic FCs, 6 (15, 0%) - with infected acute postnecrotic FCs.

In 7 (17.5%) patients with infected acute postnecrotic FCs (positive results of microbiological study and / or purulent content), after drainage and aspiration signs of relapse or persistent SIRS were observed. In 2 patients change of exudation character during treatment (transformation of brownish infected exudate into purulent), which led to the necessity of performing minimal laparotomy and necrectomy in 3 (7.5%) patients and laparotomy with laparotomy and necrectomy in 4 (10.0%) patients.

In 3 (9.7%) patients with infected acute postnecrotic FCs after drainage and aspiration the signs of compression and persistent SIRS were observed. Preservation of the above signs was due to the presence of extensive pancreatogenic infiltration and the dominance of the tissue component over the fluid. These patients underwent laparotomy, laparotomy, necrectomy.

In Group I, the average duration of hospitalization was 28.7 ± 3.4 days, and mortality rate was of 7.5%.

In the second group SIRS was noted in 20 (62.5%) patients, signs of infection according to visualizing methods (air and / or high density of FCs content with a tendency to rapid increase of the volume) - in 15 (46.9%), signs of compression - in 16 (50.0%). FCs were localized in one department of the abdomen in 12 (37.5%) patients, in two departments - in 17 (53.1%), in three de-

partments - in 3 (9.4%). In 29 (90.6%) patients, the shape of FCs was irregular and irregular border was noted in 17 (53.1%) patients. The size of FCs was up to 5 cm - in 1 (3.1%) patient, 5-10 cm in 12 (37.5%), more than 10 cm - in 19 (59.4%). The structure of FCs content was homogeneous in 12 (37.5%) patients, heterogeneous due to the presence of tissue component - in 12 (37.5%), heterogeneous due to the presence of tissue component and air - in 8 (25.0%), in 10 (31.2%) patients high density of the content of FCS at the same time. The presence of pancreatogenic infiltrate was noted in all patients. Thus in most patients of group II (62.5%) were noted acute post-necrotic FCs too.

17 patients underwent ultrasound guided puncture and aspiration of FCs. 15 patients underwent ultrasound guided drainage of FCs. In the course of puncture, aseptic content was noted in 9 (52.9%), infected in 5 (29.4%), purulent - in 3 (17.7%) patients. Thus, in 47.0% of patients with duration of disease up to 4 weeks puncture infected FCs were revealed.

In 10 (58.8%) patients, after the puncture and aspiration of FCs the regression of signs of compression and SIRS were noted. In the course of dynamic ultrasound, FCs were not visualized, and a gradual decrease in the prevalence of pancreatogenic infiltrate was noted. In these patients puncture of FCs with aspiration was definitive in treatment. Among these patients: 4 (40.0%) with aseptic acute parapancreatic FCs, 2 (20.0%) with infected acute parapancreatic FCs, 3 (30.0%) with aseptic acute postnecrotic FCs, 1 (10.0 %) - with infected acute postnecrotic FC.

2 (11.8%) patients with aseptic acute postnecrotic FCs needed repuncture of FCs with aspiration. In 2 (11.8%) patients with infected acute post-necrotic FCs signs of persistent SIRS were observed and there was recurrence of FCs after puncture under ultrasound guidance and aspiration which demanded the performance of drainage of FCs. 3 (17.6%) patients in the course of ultrasound guided puncture with aspiration of FCs purulent content was revealed and that is why ultrasound-guided drainage of FCs was performed. In 2 of them, there was a recurrence of SIRS with dominance of the tissue component in FCs at the same time. These patients underwent necrectomy, and puncture of FCs contributed to delaying the timing of necrosectomy before demarcation of the necrosis.

Thus, puncture of FCs under the ultrasound guidance as the first step of treatment of patients with acute parapancreatic and acute post-necrotic FCs was enough for treatment of 15 (88.2%) patients, among them 29.4% of patients with infected FCs, and 5.9% patients with purulent content of FCs.

15 patients of group II underwent drainage of acute post-necrotic FCs under the ultrasound guidance due to the presence of signs of infection on image and / or high density of FCs content. In 11 (73.3%) of them the drainage of FCs was definitive in treatment, 4 (26.7%) - required the necrosectomy due to retention of compression signs and / or persistent SIRS, and the dominance of the tissue component in FCs. To reveal the cause of maintaining the signs of compression after aspiration of liquid content of FCs, we conducted MRI, which in T1, T2 modes allowed clearer determine the prevalence of the tissue component. Drainage of FCs as the first step of treatment allowed delaying the necrosectomy before demarcation of the necrosis and stabilization of patients.

There were no complications related to puncture or drainage. In group II, in 81.2% of patients minimal invasive surgical interventions were effective. Puncture-drainage interventions contributed early detection of infected FCs, removal of infected contents, and avoidance of septic complications. Differentiated approach to the use of minimally invasive treatment as the first stage of the step-up approach to treatment, contributed reducing the frequency of drainage of aseptic and infected FCs without suppuration, in patients of group II helped to improve the results of treatment, specifically to reduce the duration of hospitalization of patients, 23.6 ± 5.2 and to decrease mortality rate to 3.1%.

Conclusions. SIRS was noted both in patients with aseptic FCs and in patients with infected FCs. In patients with acute pancreatitis, the duration of the disease up to 4 weeks, as well as the presence of SIRS, is not a specific sign of infection only. Ultrasound-guided diagnostic puncture of FCs is a safe method that facilitates early diagnosis of infected FCs.

Ultrasound guided puncture with aspiration can reduce the incidence of purulent-septic complications and be definitive in treatment for aseptic acute parapancreatic FCs and aseptic acute post-necrotic FCs. Infected FCs without suppuration do not require routine drainage. Drainage is absolutely indicated in case of purulent content and persistent SIRS in patients after primary puncture of infected FCs.

Reducing the drainage frequency of aseptic and infected FCs without suppuration in patients of the II group contributed the improvement of the results of treatment, specifically decreasing the duration of hospitalization of patients and reducing the mortality rate.

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