

Outcomes of resection of giant splenic cysts

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ABSTRACT: Three cases of giant, nonparasitic splenic cysts in young patients are presented. The cysts were poorly-symptomatic and manifested with mild upper-abdominal pain and discrete change of abdominal contour. The diagnosis was made based on USG and abdominal CT. Upon operation, the cysts were successfully excised, sparing almost the whole spleen, using standard instruments: electric knife and LigaSure instrument. The postoperative course was uneventful in all cases. At the 4–6-months follow-up, all patients were in good shape and CT showed no signs of recurrence. The results of this case series show that giant splenic cysts may be relatively safely resected, sparing almost the whole spleen.

KEYWORDS: operative treatment, sparing surgery, splenic cyst

ABBREVIATIONS

CT – computed tomography

USG – ultrasound

INTRODUCTION

Splenic cysts belong to relatively rare pathologies, and are essentially divided into parasitic and nonparasitic. The first of those are most often caused by: infection with hydatid tapeworm (Latin *Echinococcus granulosus*), the transfer of parasite larvae into the bloodstream and settling in internal organs, including the spleen. Nonparasitic cysts are divided into primary and secondary, of which the former constitute congenital lesions of dermoid, epidermoid or endodermoid type. Secondary cysts are most often post-traumatic and develop after interstitial or subcapsular splenic ruptures, and notably less frequently in the course of certain diseases, such as: infectious mononucleosis, tuberculosis or malaria [1–3]. Most small and medium-sized splenic cysts do not display any clinical signs and are discovered incidentally, during ultrasound examination of the abdominal cavity in the course of diagnosis of other diseases or during autopsy [4–6]. Symptomatic cysts are usually of considerable size, and the symptoms caused by them are non-specific and nonburdensome, e.g. asymmetric enlargement of abdominal contour, noticeable resistance in the left hypochondrium and aching pain in this area.

In this paper we review the results of surgical treatment of 3 patients with giant, nonparasitic splenic cysts, in whom resection of the cyst alone and sparing of the organ was possible.

CASE REPORT

Case no.1

A 24-year-old woman, dentistry student, noticed an asymmetry of the stomach contour with a protrusion in the left hypochondrium. She experienced no symptoms, did not lose weight, had a good appetite and attended classes at university. During exercises in internal medicine, she asked for an ultrasound of the abdominal cavity due to a change in the appearance of her abdomen.

Unexpectedly, the screen showed an image of a huge cyst emerging from the spleen. This diagnosis was confirmed by a CT of the abdominal cavity (Fig. 1A., B.).

The cyst was single-chambered, filling the entire left upper abdomen and umbilical region, pushing the spleen back and the left kidney downward. The examination did not reveal the presence of other cysts or other pathological changes in the abdominal cavity. On clinical examination, the tumor was palpable 10 cm below the left costal arch and extended to the abdominal midline (Fig. 2.).

The patient was admitted to the clinic headed by the author of this study. Due to the large size and the risk of rupture, testing for possible echinococcosis was not performed in advance, as the waiting time for a blood test result is approx. 7 days. The case was consulted with an infectious disease specialist who, based on the radiological picture and the clinical course, concluded an unlikely echinococcal character of the cyst; he suggested a prompt operation and histopathological examination of the resected cyst. The patient was operated as follows: under general anesthesia, the abdominal cavity was opened with an incision under the left costal arch, revealing a large, thin-walled cyst extending from the spleen. The cyst was punctured and a total of 2.5 liters of serous fluid was evacuated. The spleen was then mobilized and rolled over the abdomen, when it was found that the cyst wall smoothly merged into the parenchyma, without the possibility of enucleation (Fig. 3A.). For this reason, the cyst was excised with an electric knife, while attempting to maintain a thickness of about 0.5 cm of the splenic parenchyma (Fig. 3B.). In the course of excision, the bleeding vessels were coagulated or punctured, and after excision was completed, its inner wall remaining on the surface of the splenic stump was coagulated. The spleen itself was somewhat larger than the average size, but no additional pathologies were found within it (Fig. 3C.). The “cavity” of the excised cyst was filled with a fragment of the greater omentum (Fig. 3D.). No major blood loss was noted during the operation. The abdominal cavity was closed with a layered suture, leaving the drain within the left hypochondrium. The postoperative course was uneventful, and the patient was discharged home on day 4. Histopathological examination of the cyst wall revealed a fibrous pattern partially lined with the mesothelium. There were no signs of echinococcosis infection or neoplastic proliferation. The patient did not report any symptoms and led a normal lifestyle in 6-month follow-up. CT showed a somewhat

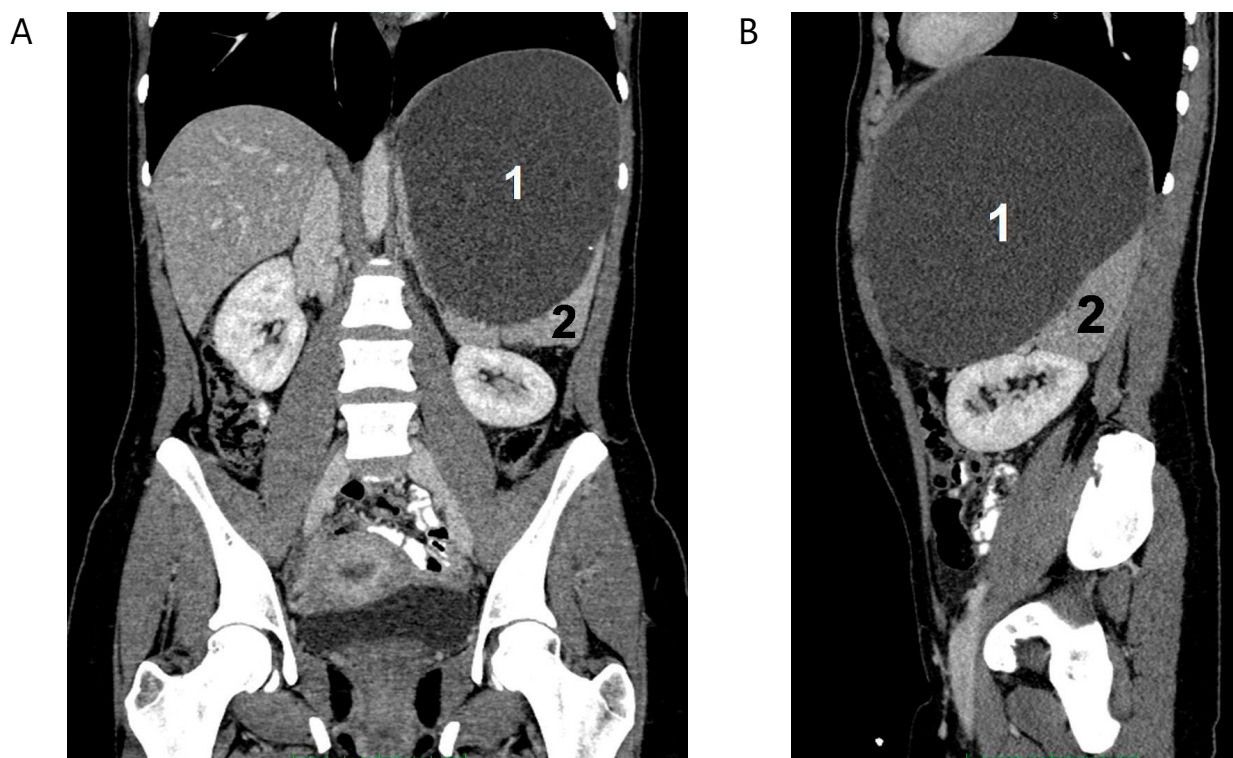


Fig. 1. (A) Case no. 1. Abdominal CT with visible huge splenic cyst (p-a view). Designation: 1—cyst, 2—splenic parenchyma; (B) Case no.1. Abdominal CT with visible giant splenic cyst (lateral view).

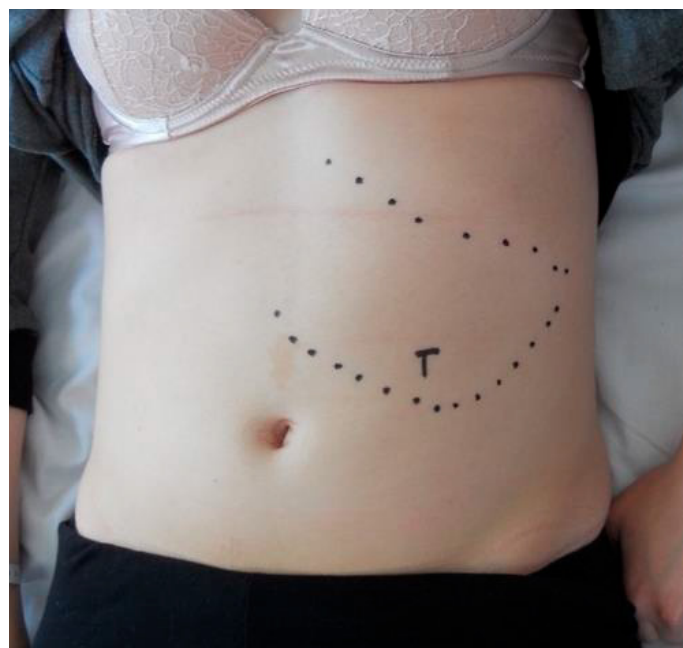


Fig. 2. View of patient's abdomen with marked outline of palpable splenic cyst (bottom line) and costal arch (top line).

enlarged spleen, fused along the lower pole with the omental conglomeration, without any pathological changes.

Case no. 2

An 18-year-old man presented to our center with his parents due to a giant splenic cyst diagnosed on ultrasound and CT scans (Fig. 4A., B.). In the patient interview, he reported only aching pain in the left upper and lower abdomen persisting for about 3 months; he did not lose weight, he had a good appetite and attended school. Prior to surgery, he underwent negative tests for the presence of

echinococcal infection, and standard vaccinations (meningococci, pneumococci) in the event of the need for splenectomy.

The operation was performed under general anesthesia. The abdominal cavity was opened with an incision under the left costal arch, revealing an enlarged spleen protruding approx. 2 cm from under the costal arch. However, unlike in the previous case, the cyst was not visible as it was surrounded by a layer of splenic parenchyma from front, as suggested by the CT scan (Fig. 4A., B.). Despite several attempts, it was not possible to release the spleen and roll it onto the abdomen due to solid adhesions (although the patient had not had a laparotomy before). However, it could be pulled down so that half of it protruded under the costal arch. The cyst was localized on palpation and punctured with a thick needle, evacuating about 0.7 liters of serous fluid. Then, as in the previous case, the cyst was cut from the splenic parenchyma. Because the borderline between the cyst and the spleen was uncertain and the cyst wall was covered with 0.5–1 cm thick parenchyma, an instrument for incision and simultaneous coagulation (LigaSure) was used. Nevertheless, it was necessary to ligate the bleeding cyst wall several times. Eventually, it was completely excised, but due to unfavorable operating conditions, the internal wall which remained on the surface of the splenic stump, was not coagulated. The cyst cavity was filled with a fragment of the greater omentum. Blood loss during surgery was approx. 0.5 liters, hence the patient did not require transfusion. The postoperative course was uneventful, and the patient was discharged home on day 5. Histopathological examination of the cyst wall revealed a benign mesothelial cyst, lined with metaplastic epithelium, without atypia. In the 4-month follow-up, the patient did not report any symptoms, attended school and led a normal lifestyle. As in the previous case, the CT showed a moderately enlarged spleen fused along the lower pole with the omental conglomeration, without any pathological changes.

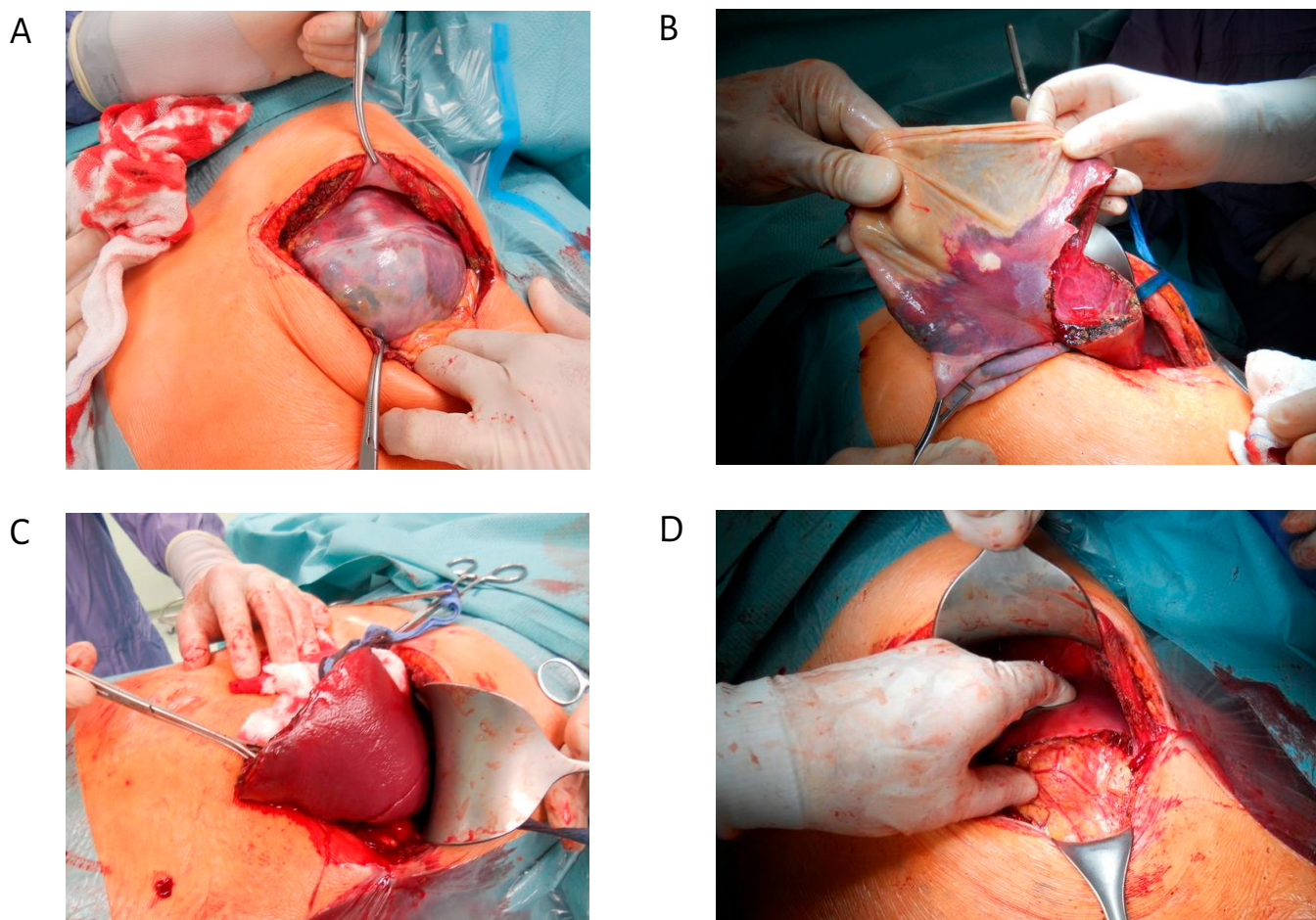


Fig. 3. (A) View of cyst after opening the abdominal cavity; (B) Cyst cut from splenic parenchyma; (C) View of spleen preserved after cyst has been cut off; (D) Filling the defect in the splenic parenchyma with omentum before closure of abdominal cavity.

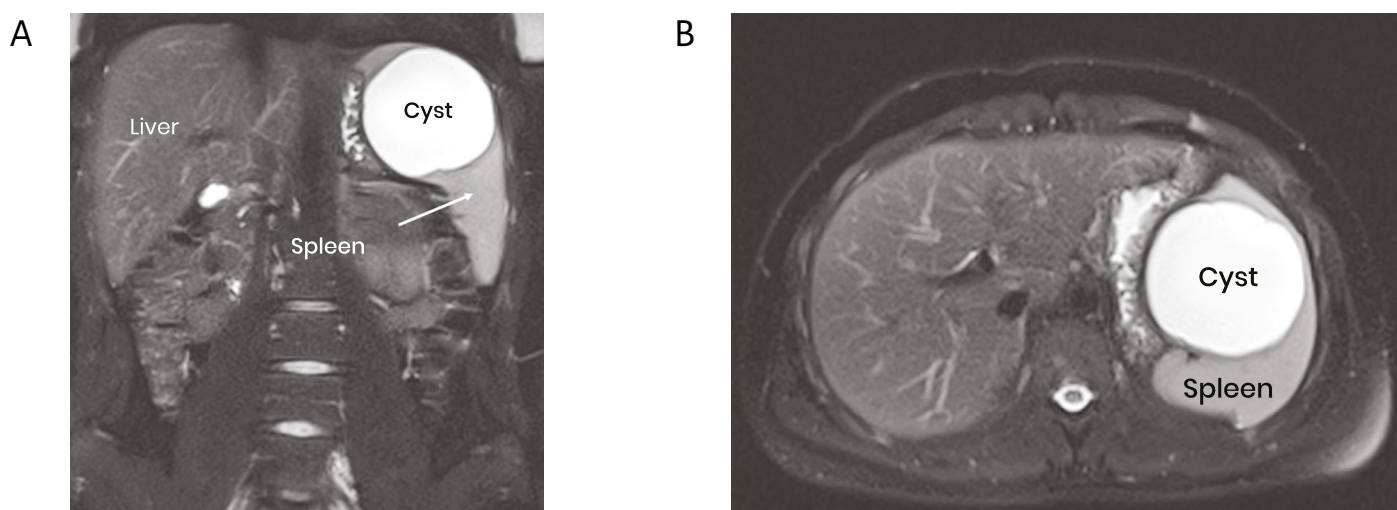


Fig. 4. (A) Case no. 2. Abdominal CT with view of giant splenic cyst (p-a view); (B) Case no. 2. Abdominal CT with view of giant splenic cyst (horizontal view).

Case no. 3.

A 42-year-old man presented to our center due to a giant splenic cyst diagnosed in ultrasound and CT scans (Fig. 5A., B.). In the interview, he only reported aching pain in the left upper abdomen and umbilical region persisting for about 2 months; he did not lose weight, had a good appetite, and worked in an office. Tests for the presence of possible echinococcosis infection were negative and the patient had standard vaccinations should it be required to excise the entire

spleen. During the operation, the spleen was released and rolled over the abdomen, and after puncture of the cyst and evacuation of about 1.2 liters of fluid, it was cut from the parenchyma with LigaSure. The postoperative course was uneventful, and the patient was discharged home on day 4. Histopathological examination revealed a mesothelial fibrous cyst with degenerative changes, mainly in the form of calcifications. In 4-month follow-up, the patient reported no complaints, returned to work and practiced recreational sports.

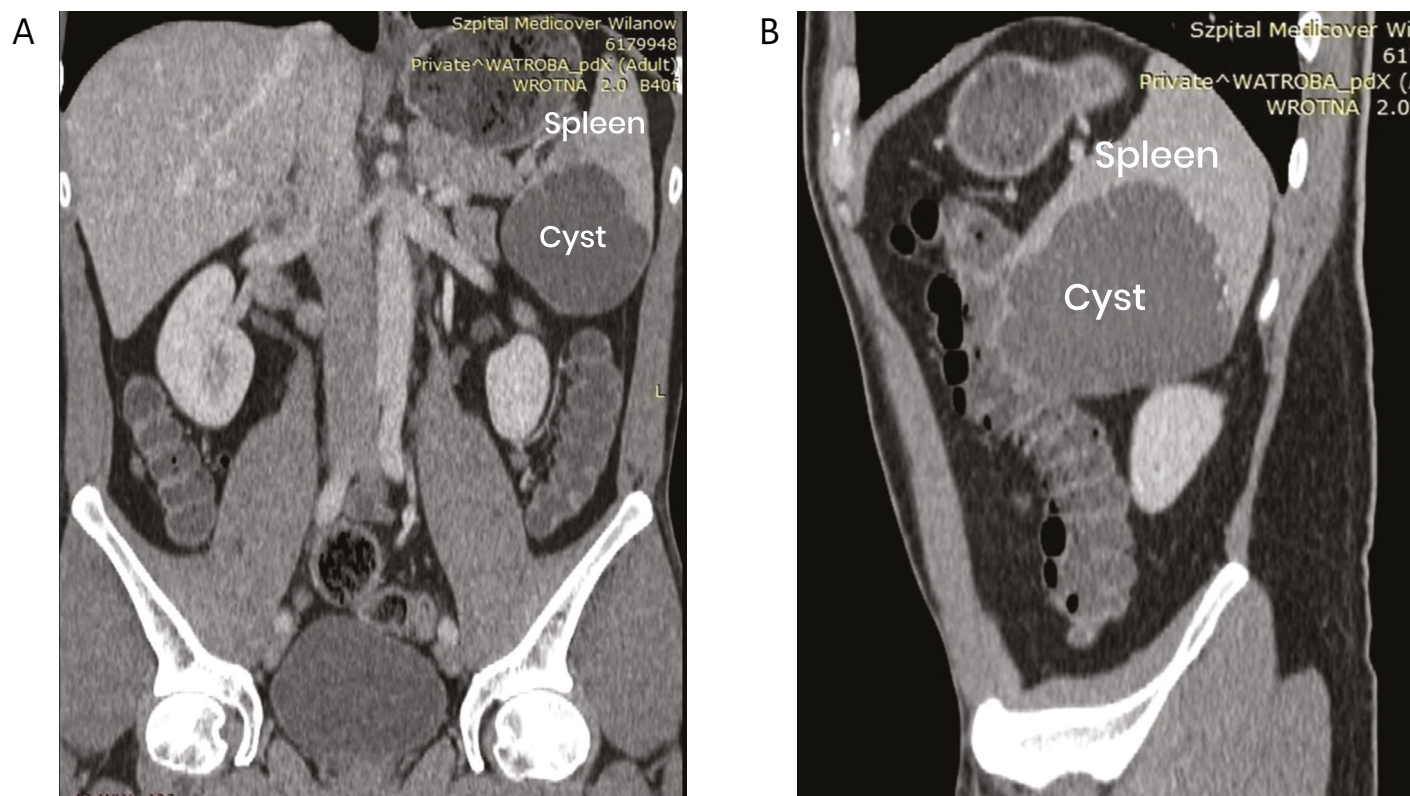


Fig. 5. (A) Case no. 3. Abdominal CT with view of giant splenic cyst (p-a view); (B) Case no. 3. Abdominal CT with visible giant splenic cyst (lateral view).

In follow-up CT, the spleen was moderately enlarged and fused by the lower pole with the omental conglomerate, without any pathological changes. In its vicinity 2 small lesions were identified, 1 cm in diameter, which were described as (probably) additional spleens.

In the first two cases, the cyst was located in the frontoanterior portion of the spleen; in the first case it was thin-walled and almost entirely uncovered with the splenic parenchyma, while in the second case it was located inside the organ, and its anterior and lower walls were covered with an approx. 0.5–1 cm layer of parenchyma. In the third patient, the cyst was located in the lower portion of the organ and half of the anterior wall was covered with a 0.5 cm layer of parenchyma. From the perspective of operational difficulties, the first case, although it involved the largest cyst, was technically the easiest.

DISCUSSION

Nonparasitic and non-traumatic splenic cysts are rare and there are limited publications on this subject. The types and causes of splenic cysts were mentioned in the introduction. Treatment of splenic cysts depends primarily on their size. Small cysts with a diameter not greater than 4–5 cm can be treated conservatively and monitored, while larger ones require surgical management due to the possibility of rupture, which can cause: severe pain, intraabdominal bleeding or infection. The spectrum of interventions and surgical techniques used is broad:

- puncture and evacuation of cyst contents assisted by ultrasound,
- partial excision of cyst (fenestration or marsupialization),
- complete excision of cyst with sparing of spleen,
- excision of cyst together with spleen.

Surgical treatment can be performed using open method or laparoscopic method, whereby the latter is presently much more common.

The review of literature, most of which consists of case studies, demonstrates that [1–6]:

- percutaneous puncture of the cyst is performed reluctantly due to the fear of complications (bleeding, infection) and a high rate of recurrence. It may be useful before elective surgery to reduce the size of the cyst;
- medium-sized cysts (up to 10 cm in diameter) are relatively often laparoscopically excised with sparing of the spleen;
- giant cysts (>10 cm in diameter) are operated by means of open method and often require excision of the spleen (it is difficult to separate the organ from the lesion);
- partial cyst excision (fenestration and marsupialization) is associated with a relatively high rate of recurrence;
- the frequency of relapses after partial and spleen-sparing cyst resection is higher following laparoscopic (41%) than after open (2%) surgery;
- total excision of the spleen with the cyst should be performed only in cases where sparing surgery is not possible. Such situations include: several cysts in the spleen, a giant cyst and the location of the cyst in the splenic hilum;
- after complete excision of the spleen with the cyst, implantation of a fragment of the splenic tissue into the greater omentum can be performed, which allows for partial restoration of the function of the excised organ in some cases.

There are 6 cases in the literature describing the treatment of splenic cysts of similar size. A case from the Polish literature concerned a 28-year-old woman with a cyst measuring 10 x 8 x 6 cm.

The operation was performed by means of laparoscopy, but the entire spleen with the cyst was resected [2]. In the second case, the cyst found in a 20-year-old woman was 20 cm in diameter and was laparoscopically excised with the entire spleen. Histopathological examination showed that it was a pseudocyst, formed from a subcapsular hematoma of the spleen [3]. In both cases, the symptoms, such as aching pain and a feeling of epigastric pressure, persisted for 3 months. Further 2 cases of giant, nonparasitic splenic cysts concerned teenage girls. They were diagnosed on the basis of clinical symptoms and imaging tests, and treatment consisted of excision of the spleen with the cyst [4, 5]. In the fifth case, the cyst was accidentally detected in a 41-year-old woman during diagnosis of gallstone disease. It was asymptomatic and was excised 2 years after detection, when it was 7 cm in diameter. As in our series, laparoscopic excision of the cyst alone was performed with sparing of the spleen and the splenic stump was covered with an omentum flap [6]. It is questionable whether this part of the operation is justified. Perhaps in the future this will cause problems with surgery for, e.g. the stomach or large intestine (splenic flexure of the colon) due to adhesions with these organs. This was used by the author to prevent the formation of a fluid collection in this area as well as possible recurrence. The literature contains a publication confirming the legitimacy of filling the cyst cavity or covering the splenic stump with a flap of the greater omentum; this

is intended to reduce postoperative bleeding, prevent intestinal adhesions and recurrence [7]. One case of successful excision of a giant splenic cyst with sparing of the organ has been previously described by the author of the present study [8].

The literature also contains publications on the rupture of giant splenic cysts which, according to these reports, may be life threatening. In the first case, the previously undiagnosed giant splenic cyst was ruptured after minor abdominal trauma. However, it did not cause bleeding into the peritoneal cavity, but gave only symptoms of diffuse peritonitis. Correct diagnosis was established on the basis of a CT scan of the abdominal cavity, and treatment consisted of excision of the spleen together with the remnant cyst [9]. In another example, the previously undiagnosed giant splenic cyst ruptured spontaneously. Unlike in the previous case, it caused hypovolemic and anaphylactic shock, which led to the patient's death [10, 11].

The presented cases show that relatively safe excision of giant splenic cysts, with sparing of the organ and using standard instruments and surgical technique, is possible. This is of importance, especially in young people for whom the spleen is a key organ of immune protection. In all 3 cases, there was no major hemorrhage during surgery, and no patient required blood transfusions.

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