

## CASE REPORT / ПРИКАЗ БОЛЕСНИКА

# Splenic cyst following trauma, the intraoperative decision on definitive management

Vladimir Milosavljević<sup>1</sup>, Nikola Grubor<sup>2,3</sup>, Boris Tadić<sup>2,3</sup>, Miljan Čeranić<sup>3,4</sup><sup>1</sup>Bežanijska Kosa University Hospital Medical Center, Department for HPB Surgery, Belgrade, Serbia;<sup>2</sup>University Clinical Centre of Serbia, Clinic for Digestive Surgery, Department for HPB Surgery, Belgrade, Serbia;<sup>3</sup>University of Belgrade, Faculty of Medicine, Belgrade, Serbia;<sup>4</sup>University Clinical Centre of Serbia, Clinic for Digestive Surgery, Department for Colorectal Surgery, Belgrade, Serbia**SUMMARY**

**Introduction** Posttraumatic splenic cysts are most commonly the result of blunt force trauma to the abdomen. They usually develop from subcapsular or intraparenchymal hematomas and are typically asymptomatic. Diagnostics includes clinical history and radiological imaging procedures. Surgical treatment is the only curative modality of treatment.

**Case outline** A 43-year-old female patient, without comorbidities, was admitted to the health institution for additional diagnostics and surgical treatment. Laboratory test results were within the reference ranges, while serological test results for hydatid disease were negative. An abdominal CT examination was subsequently performed confirming a splenic cyst positioned in the central part of the spleen. After a laparoscopic partial pericystectomy of the cyst, we identified another smaller cyst of the spleen. According to the estimation of the surgical team, the intraoperative appearance of the remaining tissue of the spleen was less than a third of the entire spleen. The decision was taken to perform a splenectomy in the best interests of the patient, bearing in mind the possibility of complications

**Conclusion** Accurate diagnosis of posttraumatic splenic cysts remains a challenge, despite state-of-the-art radiological imaging procedures that are applied. In addition to the well-known modalities of treatment, the laparoscopic surgical approach, i.e., minimally invasive treatment, should be the one of choice, if the situation allows it. The laparoscopic approach is a diagnostic and therapeutic method whose effect can especially be observed when the intraoperative finding differs from the preoperative radiological finding.

**Keywords:** spleen; splenic cyst; laparoscopy; partial pericystectomy

**INTRODUCTION**

Posttraumatic or secondary splenic cysts (SSC) are most commonly the result of blunt force trauma to the abdomen. According to the literature, the prevalence of SSC is 75–80% of all splenic cysts [1]. They usually develop from subcapsular or intraparenchymal hematomas. They are also called pseudocysts, as there are no epithelial cells in their outer wall, which is the main difference from true splenic cysts [1, 2].

These cysts are typically asymptomatic, although, in larger cysts, symptoms may occur in the form of abdominal discomfort especially in the left upper quadrant, occasional pain, nausea, and other nonspecific symptoms [2].

Diagnostics includes clinical history and abdominal ultrasonography; however, some more data can be obtained with computerized tomography (CT) and nuclear magnetic resonance imaging (NMRI) of the abdomen. Nevertheless, caution is advised, given that, as data available in current literature indicates, around 10% of splenic cysts are misdiagnosed. Differential diagnostics are most often considered: abscesses, hematomas, and primary cysts of the spleen [3, 4].

The only curative modality of treatment is surgical treatment, which can include less radical procedures through a minimally invasive approach, as well as splenectomy [1, 5].

The aim of this paper is to present an operating technique, with an emphasis on the importance of the intraoperative finding in reaching a decision on definitive treatment of posttraumatic splenic cysts.

**CASE REPORT**

This report presents a 43-year-old female patient, in good general health, without comorbidities, who was admitted to our department for additional diagnostics and management complaining of indeterminate abdominal symptoms. The clinical history showed that she had an allergy to iodine and contrast agents and that she had a skiing accident four years earlier. Several weeks after, a splenic cyst (4 × 3 cm) was diagnosed by abdominal ultrasound examination. Since then, throughout the regular check-ups, the cyst showed an increase in size compared to the previous examination. Prior to hospitalization, the patient felt symptoms in

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**Correspondence to:**

Nikola GRUBOR  
Department for HPB Surgery  
Clinic for Digestive Surgery  
University Clinical Centre of Serbia  
6 Koste Todorovića Street  
Belgrade 11000, Serbia  
[n.grubor@yahoo.com](mailto:n.grubor@yahoo.com)

the form of discomfort and non-specific pain in the upper left quadrant of the abdomen, especially during physical activity.

Upon admission, an abdominal ultrasound was performed, which confirmed the finding of a cystic mass in the central part of the spleen. Laboratory test results were within the normal ranges. Serological test results for hydatid disease were also negative. An abdominal CT examination was subsequently performed confirming a splenic cyst which was 7 × 6 cm in size and predominantly positioned in the central part of the spleen, with the intracystic fluid density of 23 Hounsfield units (HU) (Figure 1).

After the diagnostic procedures were completed, a decision was made to carry out surgical treatment. Bearing in mind the experience of many years in minimally invasive splenic surgery, the strategy was to perform partial pericystectomy.

With the patient under general anesthesia, pneumoperitoneum was created with the use of the Veress needle. The patient was previously placed in the right lateral position in relation to the operating table. After the placement of working ports on the sites typical for this type of procedure, and after the introduction of the laparoscope, apart from a large splenic cyst with marked white discoloration of the capsule, as compared to the parenchyma. First, cyst puncture and the aspiration of the cyst content were performed. Next, partial pericystectomy with the removal of the cyst wall was carried out, up to the margin of healthy splenic tissue (Figure 2), using a harmonic scalpel (Ethicon Endo-Surgery, Inc, Cincinnati, OH, USA).

Then, to the surprise of the surgical team, a new cyst was identified laterally to the site of the previous cyst and towards the splenic hilum. This cyst was smaller, with the same characteristics as the larger one, and with no communication with the previous cyst (Figure 3).

The second cyst was treated in the same way as the first one. According to the estimation of the surgical team, the intraoperative appearance of the remaining tissue of the spleen was less than a third of the entire spleen. The decision of the team, at that moment, was to complete the procedure as planned preoperatively. However, a small amount of fresh blood appeared in the cavity of the larger cyst, and on the inner wall of the larger cyst. The decision was taken to perform a splenectomy in the best interests of the patient, bearing in mind the high possibility of bleeding. Laparoscopic splenectomy was performed in the standard manner, with the use of the aforementioned laparoscopic harmonic scalpel for dissecting the ligament system of the spleen and sealing the short gastric arteries. The vascular elements of the hilum were managed with an endovascular stapler (EndoGIA, Autosuture, Covidien, Mansfield, MA, USA). After complete mobilization and separation from the surrounding structures, the spleen was placed in a polyethylene bag for extraction (EndoCatch II, Autosuture, Covidien), within which the destruction and fragmentation of the remaining splenic tissue was performed, with the use of surgical instruments. The fluid aspirated from both cysts, parts of the cyst walls and the remaining splenic tissue were sent for pathohistological (PH) examination.

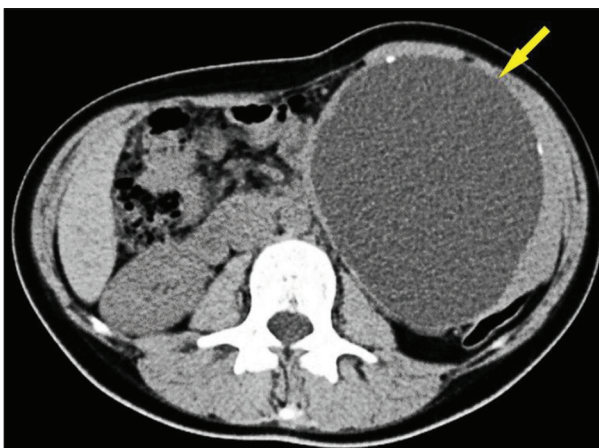


Figure 1. Preoperative abdominal computed tomography finding

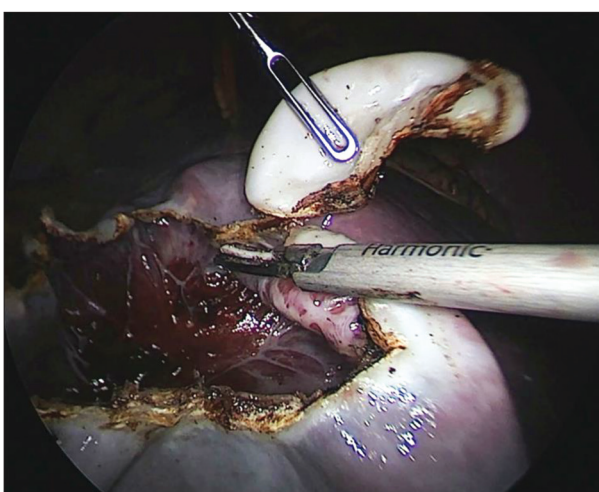


Figure 2. Image of partial pericystectomy and biopsy material sampling

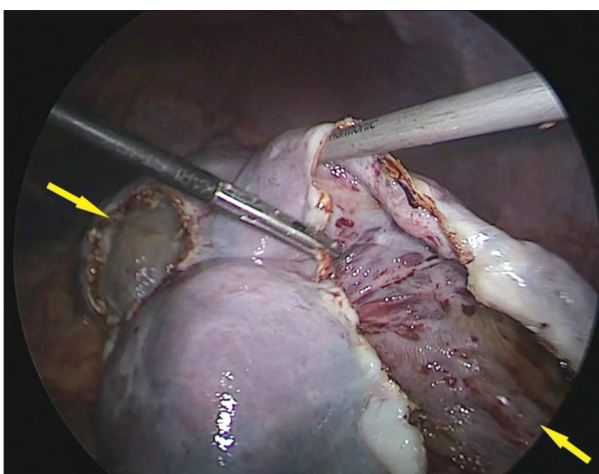


Figure 3. Intraoperative image of the spleen after the treatment of both cystic lesions

PH analysis confirmed a definitive finding of secondary pseudocysts of the spleen. The cyst walls were without epithelial tissue, and the cyst content without any special characteristics, while the remaining splenic tissue was also histomorphologically normal.

Postoperative recovery was uneventful. The patient was discharged from hospital on the third postoperative

day with prescribed prophylactic antibiotic treatment and postoperative immunization.

All procedures performed were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written consent to publish all shown material was obtained from the patient.

## DISCUSSION

SSC comprise around 2/3 of all splenic cysts, and blunt abdominal trauma is considered to be the main cause of their formation. Most of them (80%) are unilocular; multilocular cysts are a rare finding [1, 6].

In our patient, the formation of the secondary cyst was linked to a previous abdominal trauma, similar as the most cases reported in literature. What makes this case characteristic is the fact that, despite the use of the modern imaging diagnostic, the second splenic cyst remained unnoticed.

SSC are not common and usually remain undetected, since they are mainly (30–60%) asymptomatic [7].

The diagnostics of these lesions should, in addition to the data obtained through anamnesis, include serological tests for hydatid infection, especially in endemic areas, as well as modern radiological imaging procedures, such as CT and NMRI [4, 8].

Surgical treatment presents the only safe and efficient treatment modality. Besides the complete splenectomy,

there are also less radical surgical procedures, such as decapsularization, unroofing, partial pericystectomy, and, to a certain extent, partial splenectomy [1, 8, 9].

There are data in the literature on the effectiveness of sclerotization with alcohol as well as on percutaneous treatment known as PAIR (puncture, aspiration, injection, reaspiration) [10, 11]. The insight into the effectiveness of these techniques is limited to a small number of case reports, without larger series and without data on long-term follow-up of patients treated in this way.

Most authors suggests that caution is necessary in applying these procedures due to a high recurrence rate and the possibility that the cyst could be a diagnostically unrecognized parasitic cyst, which is why these methods should be reserved for patients in whom surgical treatment is contraindicated or who refuse surgery [1, 5, 7].

Accurate diagnosis of posttraumatic splenic cysts remains a challenge, despite widely available state-of-the-art radiological imaging procedures. In addition to the well-known treatment modalities, the laparoscopic surgical approach should be also considered. The minimally invasive approach is at the same time a diagnostic and a therapeutic method, and such an approach is particularly effective when the intraoperative finding differs from the preoperative radiological finding. Finally, minimally invasive surgery offers excellent cosmetic results compared to open surgery. The cosmetic effect should not be the most important deciding factor, but is an important detail, especially in younger people.

**Conflict of interest:** None declared.

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## Посттравматска циста слезине, интраоперативна одлука о дефинитивном третману

Владимир Милосављевић<sup>1</sup>, Никола Грубор<sup>2,3</sup>, Борис Тадић<sup>2,3</sup>, Миљан Ђеранић<sup>3,4</sup>

<sup>1</sup>Универзитетски клиничко-болнички центар „Бежанијска коса“, Одељење за ХПБ хирургију, Београд, Србија;

<sup>2</sup>Универзитетски клинички центар Србије, Клиника за дигестивну хирургију, Одељење за ХПБ хирургију, Београд, Србија;

<sup>3</sup>Универзитет у Београду, Медицински факултет, Београд, Србија;

<sup>4</sup>Универзитетски клинички центар Србије, Клиника за дигестивну хирургију, Одељење за колоректалну хирургију, Београд, Србија

### САЖЕТАК

**Увод** Посттравматске цисте слезине најчешће су последица тупе трауме абдомена. Обично настају из супкапсуларних и интрапаренхиматозних хематома и углавном су асимптоматске. Дијагностика обухвата историју болести и радиолошке процедуре снимања. Хируршки третман је једини потпуни модалитет лечења.

**Приказ болесника** Болесница стара 43 године, без коморбидитета, примљена је у здравствену установу због додатне дијагностике и хируршког лечења. Резултати лабораторијских испитивања били су у референтним вредностима, док су резултати серолошких тестова за хидатидну болест били негативни. Преглед абдомена компјутеризованом томографијом је потврдио цисту слезине која се налазила у централном делу слезине. Након лапароскопске парцијалне перицистектомије уочена је још једна мања циста слезине.

Према интраоперативној процени хируршког тима, остатак ткива слезине је био мањи од једне трећине слезине. Донета је одлука да се учини спленектомија у најбољем интересу болесника, имајући у виду могуће компликације.

**Закључак** Прецизна дијагноза посттравматских циста слезине остаје изазов, упркос примени најсавременијих радиолошких процедура. Поред добро познатих модалитета лечења, лапароскопски хируршки приступ, као минимално инвазивни третман, требало би да буде избор, ако ситуација то дозвољава. Лапароскопски приступ је дијагностичка и терапијска метода чији се ефекат посебно може уочити када се интраоперативни налаз разликује од преоперативног радиолошког налаза.

**Кључне речи:** слезина; циста слезине; лапароскопија; парцијална перицистектомија