

Post-traumatic splenic pseudocyst: case report and review of the literature

Potrauminė blužnies pseudocista: klinikinis atvejis ir literatūros apžvalga

Ieva Martinaitytė¹, Jonas Pivoriūnas¹, Jonas Jurgaitis^{2, 3}, Marius Paškonis^{2, 3},
 Anatolij Ostapenka^{2, 3}, Kęstutis Strupas²

¹ *Vilniaus universiteto Medicinos fakultetas, M. K. Čiurlionio g. 21, LT-03101 Vilnius*

² *Gastroenterologijos, urologijos ir abdominalinės chirurgijos klinika, Vilniaus universiteto ligoninė Santariškių klinikos, Santariškių g. 2, LT-08661 Vilnius*

³ *Vilniaus universiteto Onkologijos institutas, Santariškių g. 1, LT-08660 Vilnius*

El. paštas: jonas.jurgaitis@santa.lt

¹ *Faculty of Medicine, Vilnius University, M. K. Čiurlionio str. 21, LT-03101 Vilnius, Lithuania*

² *Clinic of Gastroenterology, Urology and Abdominal Surgery, Vilnius University Hospital "Santariškių Klinikos", Santariškių str. 2, LT-08661 Vilnius, Lithuania*

³ *Institute of Oncology, Vilnius University, Santariškių str. 1, LT-08660 Vilnius, Lithuania*

E-mail: jonas.jurgaitis@santa.lt

The post-traumatic pseudocyst is a very rare complication of the spleen rupture after blunt abdominal trauma. It is known to occur only to 1% of patients who had undergone such blunt abdominal trauma. The symptoms of the disease are reported to develop after a long post-traumatic period, thus the etiology of the pseudocyst of the spleen is hard to reveal. The aim of this paper is to present a case of the post-traumatic pseudocyst of the spleen and to discuss the strategy of the surgical management.

Keywords: post-traumatic spleen injury, splenic pseudocyst, management of splenic pseudocyst.

Potrauminė blužnies pseudocista – tai labai reta dėl uždaro pilvo traumos išsivystanti blužnies plyšimo komplikacija, pasireiškianti tik 1 % pacientų, patyrusių uždara pilvo traumą. Ligos simptomatika pasireiškia praėjus ilgam laikotarpiui po traumos, todėl yra sunku nustatyti blužnies pseudocistos etiologiją. Šiame straipsnyje pristatomas klinikinis potrauminės blužnies pseudocistos atvejis ir aptariama chirurginio gydymo taktika.

Pagrindiniai žodžiai: potrauminis blužnies sužalojimas, blužnies pseudocista, blužnies pseudocistos gydymas.

Introduction

Splenic pseudocysts are uncommon with approximately 800 reported cases in the world literature [1]. However, the spleen is known to be the most often injured organ in blunt abdominal traumas as motor vehicle accidents [2]. The majority of splenic cysts appear to occur after such trauma [1]. Post-traumatic splenic cysts usually awake symptoms and are revealed not long after induced accident because of spleen rupture. Yet, cysts can be asymptomatic for many months or years until serious complications, such as cyst rupture or hemorrhage occur. It is still not clear whether delayed splenic cysts (spleen ruptures) are misdiagnosed after trauma or initially latent injuries develop later to spleen rupture and cyst formation [3, 4]. In last two decades, more appear cysts to have been detected [5]. The reasons could be a more common use of visual techniques (ultrasonography (US), computed tomography (CT)) in routine clinical work or an increased prevalence of blunt abdominal trauma.

In this paper, we present a clinical case of large splenic cyst and discuss medical strategies for the splenic cysts management.

Case Report

A 36-year-old woman was referred to the hospital complaining of troublesome eructation and constant

aching pain in the left hypochondriac area. She denied any past medical and surgical history, but the patient mentioned a non-collision motor vehicle accident a year ago, without any medical observation after it.

The initial examination revealed no pathologic signs. The cardiovascular and pulmonary exams did not show any alterations. An abdominal exam revealed mild pain in the left hypochondriac area with splenomegaly. Other findings were unremarkable.

The patient's complete blood count showed an elevated leukocyte count of $17.06 \times 10^9/l$ with the neutrophyle count of $15.47 \times 10^9/l$. IgG CA 19.9, CEA levels and other blood tests were normal.

Ultrasonography (UG) revealed a cyst 9–10 cm in diameter on the upper part of the spleen. The abdominal computed tomography (CT) confirmed these findings (Figure 1).

Because of the high risk of spleen rupture, the surgeon was consulted. It was concluded to proceed with a cyst laparoscopic fenestration procedure. Before the procedure, the patient was vaccinated against *Haemophilus influenzae B*, pneumococcal and meningococcal infections. During operation, an enlarged (more than 15 cm long) spleen was found, with a cyst on its diaphragmatic surface. The cyst occupied almost all the spleen, and it was impossible to distinguish splenic tissue or visualize any topographic elements. The spleen was punctuated. A dark, turbid matter was revealed. Therefore it was

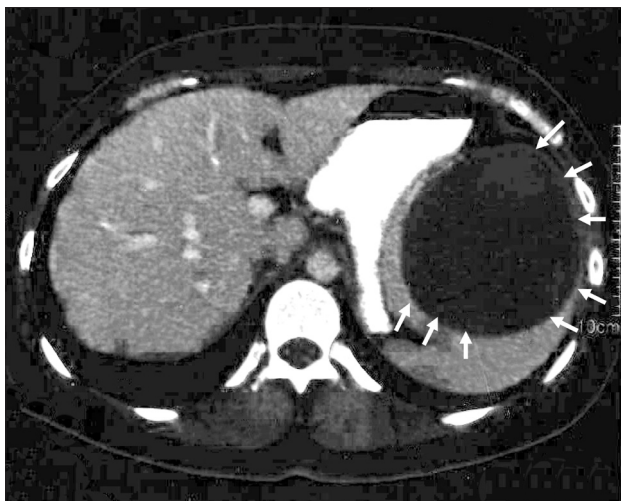


Fig. 1. CT during venous phase shows a large homogeneous hypoenhancing mass in spleen projection. Arrows point to the pseudocyst

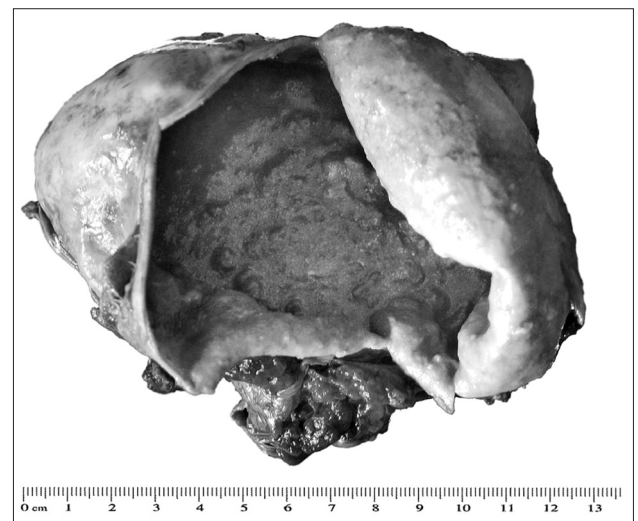


Fig. 2. The macroscopic view of resected splenic pseudocyst. Note the amorphous mass inside the cyst

decided to continue with complete splenectomy. Pathologic findings showed a splenic pseudocyst (10 × 9 × 5 cm) with an amorphous mass (without neoplastic cells, but with some fragments of erythrocytes, leukocytes, macrophages and a large amount of cholesterol crystals) in the lumen and a fibrous capsule without an epithelium layer (Figure 2). Bacteriological test showed no positive growth of bacteria.

The patient did not experience any postoperative difficulties and was discharged home on the post-operative day 4 in a stable condition.

Discussion

The spleen is the most common intra-abdominal organ injured during blunt trauma. Its traumas constitute 30.2 % of all blunt traumas. [6]. Non-parasitic and non-neoplastic cysts have been morphologically classified as true epidermoid cysts containing an epithelial lining (congenital, 80% appearing in patients under 20 years) and false cysts, also called pseudocysts, having no epithelial lining [7]. This classification is often confusing as there are many similarities between these types of cysts [8, 9, 10]. Pseudocyst is a rare clinical entity, although it comprises about three quarters of all non-parasitic cysts of the spleen [11]. It is widely held to be post-traumatic, with hemorrhagic or serous content because of resultant hematoma and a thin or thicker fibrous wall [12]. The splenic traumas result in an acute, late or occult splenic rupture. Acute ruptures occur in 90% of cases and are manifested as an intraperitoneal hemorrhage [6]. The traumatic splenic pseudocysts form before the latent (48 hours – 2 weeks after trauma, about 10% of splenic traumas) and occult (not diagnosed till rupture, very rare) ruptures [13]. Late pseudocysts rupture after so called Baude's period which can last from 2 days up to 11 years after trauma [6, 14, 15]. Many factors, including the type and intensity of abdominal trauma, the site of the vascular injury in the parenchyma, and the blood coagulation pattern also may contribute to the generation of pseudocyst [16]. In our case, Baude's period lasted one year after the car accident with a blunt trauma, and the fibrous capsule suggested a chronic inflammatory reaction.

The clinical picture varies depending to the size and localization of the pseudocyst [17]. Usually, small cysts

are asymptomatic and may be absorbed. Such cysts tend to be found accidentally. But, as in reported case, small cysts may grow progressively. Then non-acute symptoms (present in approx. two-thirds of patients) develop in relation to the cyst's growth and the mass effect (left hypochondrium pain, sometimes radiating to the left shoulder, or symptoms secondary to compression of adjacent organs, such as the stomach, left colon, left kidney, and renal artery) [18]. In the case reported above, the patient suffered from aching pain in the left hypochondriac area and eructation. In other cases, also the early satiety after meal, anorexia, vomiting, dysphagia, left lower lobe pneumonia, and atelectasis were reported [19]. Rarely, renal arterial and portal venous hypertension due to vessel compression may occur [20, 21]. Other symptoms could occur due to complications, such as pseudocyst infection, torsion, hemorrhage, or rupture (risk is considered to be higher in male), which could lead to hemoperitoneum, peritonitis, and even sepsis and death [18, 22, 23]. In case of cyst rupture or rapid increase in cyst size due to infection, acute abdominal pain may occur [24]. Cysts >4 cm should be treated as they are likely to rupture; 25 % of cysts >5 cm in diameter have been reported to rupture [22, 23]. Surgical removal of the cyst was indicated to the reported patient because of a high risk of spleen rupture (cyst size >10 cm). The delayed splenic rupture may also be provoked by underlying diseases, such as the end stage of renal disease, amyloidosis, rheumatoid arthritis, chronic lymphocytic leukemia, and sarcoidosis [25, 26, 27, 28].

In the case reported above, the palpable smooth mass in the left upper quadrant had to be pretreated to evaluate its size, localization and consistency. This was done by US (revealed cystic lesion) and CT scan (measured the accurate size and confirmed the US findings), as commonly a pseudocyst is diagnosed using visualization techniques.

Surgical intervention, usually laparoscopic or laparotomic splenectomy, was the traditional treatment of choice to manage symptomatic splenic cysts in adults [29]. Today, total splenectomy should be avoided because of the important immunological biological function of the spleen. Also, a well-documented risk of sepsis after total splenectomy was established [30, 31, 32, 33].

According to the recent literature, total splenectomy in most cases could be replaced by innovative techniques preserving the parenchyma of the spleen, such as percutaneous drainage, marsupialization, enucleation, splenectomy with autotransplantation of splenic tissue, partial splenectomy, cystectomy, sclerotherapy, etc. [16, 34, 35]. These techniques are preferred because of more favourable outcomes and a less probability of certain complications. Percutaneous drainage of splenic cyst is associated with a high incidence of complications, such as infection, bleeding and cyst reaccumulation [7]. Since in the reported case the cyst occupied most of the spleen and the lumen of the cyst was full of dark turbid mass,

total splenectomy was unavoidable. No complications have been observed for six months.

Conclusions

The cyst elimination, preferably by minimally invasive techniques, is indicated when the cyst is large, and there is a threat of complications, such as rupture, abscess formation or life threatening hemorrhage [4–19; 1–10, 16, 17]. The techniques preserving the splenic parenchyma have priority, and only if necessary, the total splenectomy may be performed in complicated cases but special preventive measures should be taken.

REFERENCES

1. Patcher HL, Hofstetter SR, Elkowitz A, et al. Traumatic cysts of the spleen – the role of cystectomy and splenic preservation: experience with seven consecutive patients. *J Trauma* 1993; 35: 460–6.
2. Ruffolo DC. Delayed splenic rupture: Understanding the threat. *J Trauma Nurs* 2002; 9: 34–40.
3. Kluger Y, Paul DB, Raves JJ, et al. Delayed rupture of the spleen – myth, facts and their importance: Case reports and literature review. *H Trauma* 1994; 35: 568–571.
4. Farhat GA, Abdu RA, Vanek VW. Delayed splenic rupture: Real or imaginary? *Am Surg* 1992; 56: 340–345.
5. Wu HM, Kortbeek JB. Management of splenic pseudocysts following trauma: a retrospective case series. *Am J Surg* 2006; 191 (5): 631–4.
6. Gaidamonis E, Pilvo traumos. *Kaunas* 2002; 510–511.
7. Carpenter G, Cotter PW, Davidson JRM. Epidermoid cyst of the spleen. *Aust N Z J Surg* 1986; 56: 365–8.
8. Burrig K-F. Epithelial (true) splenic cysts: pathogenesis of the mesothelial and so-called epidermoid cyst of the spleen. *Am J Surg Pathol* 1988; 12: 275–81.
9. Enghardt MH, Allegra SR. An immunohistologic study of splenic cyst. *Milit Med* 1987; 152: 321–3.
10. Ough YD, Nash HD, Wood DA. Mesothelial cysts of the spleen with squamous metaplasia. *Am J Clin Pathol* 1981; 76: 666–9.
11. Zinner MJ, Schwartz SI, Harold E. *Maingot's Abdominal Operations*, 10th edn. New York: Appleton & Lange, 1997: 2040.
12. Dachmann AH, Ros PR, Murari JP, Olmsted WW, Lichtenstein JE. Nonparasitic splenic cysts: A report of 52 cases with radiologicpathologic correlation. *AJR* 1986; 147: 537–542.
13. McIndoe AH. Delayed hemorrhage following traumatic rupture of the spleen. *Br J Surg* 1932; 20: 249–268.
14. Nogard FS, Lim RC Jr. Surgery of the traumatized spleen. *World J Surg* 1985; 9: 391.
15. Perry JF Jr. Injuries of the spleen. *Curr Probl Surg* 1988; 25: 749–859.
16. Balzan SM, Riedner CE, Santos LM, Pazzinatto MC, Fontes PR. Posttraumatic Splenic Cysts *Surg Today* 2001; 31(3): 262–5.
17. Cavallaro G, Albanese V, Fabiano V, Taranto F, Chiofalo MG, Dalmazio V. Pseudocisti emorragica della milza *Minerva Chir* 1997; 52: 965–969.
18. Calligaris L, Bortul M. Laparoscopic treatment of a nonparasitic splenic cyst: case report. *J Laparoendosc Surg* 1996; 6: 431–434.
19. Gibeily GJ, Eisenberg BL. Splenic cysts – diagnosis and management. *West j Med* 1988; 148: 464–6.
20. Klomp maker IJ, Haagsma EB, Slooff MJ. Splenic vein obstruction due to a solitary echinococcal splenic cyst, resulting in gastric fundus varices: An unusual cause of variceal bleeding. *HPB Surg* 1993; 6: 229–232.
21. Rakowski TA, Argy WP, Pierce L, Schreiner GE. Splenic cyst causing hypertension by renal compression. *JAMA* 1977; 238: 2528–2529.
22. Holland AJA, Ford WDA, Bourne AJ. Conservative surgery for benign non-parasitic splenic cysts. *Pediatr Surg Int* 1997; 12: 353–355.
23. Souka H, Loosemore T, Taylor RS. Laparoscopic partial cystectomy for post-traumatic splenic pseudocyst. *Endoscopy* 1997; 29: S41.
24. Ross ME, Elwood R, Yang SS, Lucas RJ. Epidermoid splenic cysts. *Arch Surg* 1997; 112: 596–599.
25. Dedi R, Bhandari S, Sagar PM, Turney JH. Delayed splenic rupture as a cause of haemoperitoneum in a CAPD patient with amyloidosis. *Nephrol Dial Transplant* 2001; 16: 2446.

26. Taylor JL, Middleton MD. Delayed rupture of the spleen in rheumatoid arthritis. *Ann Rheum Dis* 1990; 49: 545-546.
27. Peera MA, Lang ES. Delayed diagnosis of splenic rupture following minor trauma: Beware of comorbid conditions. *CJEM* 2004; 6: 217-219.
28. Albala MM, Anamur M, Bernardo JR. Delayed spontaneous splenic rupture in sarcoidosis. *R I Med J* 1989; 72: 175-177.
29. Patcher HL, Hofstetter SR, Elkowitz A, Harris L, Liang HG. Traumatic cysts of the spleen. The role of cystectomy and splenic preservation: Experience with seven consecutive patients. *J Trauma* 1993; 35: 430-436.
30. Brown AR. Immunological functions of splenic B lymphocytes. *Crit Rev Immunol* 1992; 11: 395-417.
31. Grinblat V, Gilboa Y. Overwhelming pneumococcal sepsis 25 years after splenectomy. *Am J Med Sci* 1975; 270: 523.
32. Scher KS, Scott-Conner C, Jones CW, Wroczynski AF. Methods of splenic preservation and their effect on clearance of pneumococcal bacteremia. *Ann Surg* 1985; 202: 595-599.
33. Van den Eertwegh AJ, Boersma WJ, Claassen E. Immunological functions and in vivo cell-cell interactions of T cells in the spleen. *Crit Rev Immunol* 1992; 11: 337-380.
34. Patcher HL, Hofstetter SR, Elkowitz A, Harris L, Liang HG. Traumatic cysts of spleen – the role of cystectomy and splenic preservation: experience with seven consecutive patients. *J Trauma* 1993; 35: 430-6.
35. Völk M, Rogler G, Strotzer M, Lock G, Manke C, Feuerbach S. Post-traumatic pseudocyst of the spleen: sclerotherapy with ethanol. *Cardiovasc Intervent Radiol.* 1999 May-Jun; 22(3): 246-8.

Received: Oct 19, 2009

Accepted: Nov 05, 2009