CASE REPORT

Laparoscopic upper pole splenectomy of the simple splenic cyst

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SUMMARY

Splenic cysts are rare clinic entities. Non-parasitic cysts are the most frequent cystic lesions of the spleen. In the last decade acknowledgment of the importance of the spleen function, along with development of imaging methods and surgery technics, allowed a conservative approach to be increasingly considered as the best approach in splenic cysts treatment. We present the case of a 34-year-old woman with an asymptomatic simple splenic cyst in the upper pole incidentally diagnosed in a thoracic CT. A laparoscopic upper pole splenectomy was performed on the patient, with no complications. Despite the rareness of this procedure and the fact that it was used in a simple splenic cyst, this article emphasises the idea that this approach is safe, reproducible and advantageous for the patient.

BACKGROUND

Splenic lesions with cystic presentation are rare clinical entities with an incidence of 0.07%¹ that can be classified as true or false (or pseudocysts) on the basis of the presence or absence of an internal lining epithelium, correspondingly.² True cysts can be parasitic or non-parasitic.³ Parasitic cysts are the ones with higher prevalence mainly in hydatid disease endemic regions, caused by *Echinococcus granulosus* infection. This is why it is less observed in Portugal for it is a sine endemic country.²⁻⁴ Non-parasitic cysts have a higher prevalence in non-endemic regions, being either congenital or neoplastic.⁵ Congenital cysts represent 25% of all true splenic cysts and can be observed mostly in children and young adults, being either simple, dermoids or epidermoids.⁵ The epidermoid subtype represents 10% of all epithelial cysts. The carcinoembryonic antigen (CEA) and carbohydrate antigen 19-9 markers are frequently high in the presence of an epidermoid cyst, which does not mean that there is a malignant potential. Pseudocysts embody 75% of all the cases of non-parasitic origin splenic cysts and are generally associated with a traumatic aetiology.⁶

Splenic cysts are asymptomatic in approximately 30% of the cases. The presence of symptoms depends on the cyst dimension, mainly if it goes beyond a diameter of 8 cm. The clinical presentation is variable, generally revealing weight and pain sensations in the left hypochondrium, a result from splenic capsule distension, and/or the compression of adjacent structures.⁶⁻⁷ Compressive symptoms such as nausea, vomits, flatulence and diarrhoea arise gradually. The compressive effect over the

cardiorespiratory system may originate symptoms such as pleuritic pain, dyspnoea and persistent cough. In some cases, a palpable abdominal mass may be observed.⁷ In the same way, the symptomatology may also be due to complications, such as haemorrhage, rupture or a cyst infection leading to the clinical presentation of haemoperitoneum, peritonitis and even sepsis.²⁻³

Cystic lesions of the spleen are in their majority diagnosed incidentally during an image scan.⁶ The number of diagnosed splenic cysts has been increasing as a consequence of the growth in the number of imaging scans performed nowadays.⁵

Imaging methods are important to define the presence, location and lesion dimensions, revealing its relation with adjacent structures.⁷ The imaging methods of choice in the study of cystic lesions of the spleen are ultrasonography, CTs and MRIs.⁷ On an ultrasonography, the lesion is shown as well-limited, cystic, generally anechogenic (in the absence of cyst complications) or with some thin internal echoes in suspension. The wall may or may not be visible and, although rare, it may be possible to identify parietal trabeculations and calcifications. Internal septa can also be identified.⁴⁻⁷ On a CT, cystic lesions are well defined, with hydric density and with a thin or imperceptible capsule. An abdominal CT has a higher sensitivity than an ultrasonography concerning the septa and calcification identification.⁴⁻⁷ On MRI, the cyst is hypointense on T1 and strongly hyperintense on T2 with an intensity signal identical to water without any reinforcement after the injection of contrast substances.⁴⁻⁷ Other imaging methods, such as simple abdominal radiography, study with radioisotopes and coeliac arteriography or selective splenic are rarely used today having no diagnostic advantages comparing to the methods aforementioned.⁷

While they define cystic nature, imaging methods do not allow the differential diagnosis with splenic cystic lesions of other nature. Definite diagnosis is established by the anatomopathology.⁷

In the past, the surgical approach in the treatment of splenic cystic lesions was a total splenectomy by laparotomy. Nowadays however, with the acknowledgement of the importance of spleen function, along with the development of imaging methods and surgical techniques, a more conservative surgical treatment of splenic cysts has been proposed.⁸

CASE PRESENTATION

A case of a 34-year-old Caucasian woman, call centre operator and a non-professional boxing

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fighter. As to family history, it was emphasised that the patient's husband is HIV and HCV positive. However, the patient's serological tests came out with negative results to these agents. Relating to the patient's medical history it is important to mention repetition pneumonias (one in 2003 and another in April 2012). It was in the context of a persistent consolidation image on the left lung that a thoracic CT was requested in a pulmonology appointment. This scan detected a subpleural microoval-shaped thickening of the right upper lobe with about 3 mm suggesting an aftermath lesion. It also identified, in the left upper abdominal region, in an adjacent position to the anterior border of the spleen, a bilobed cystic form with 5 cm with some apparently calcified high-density outbreaks in its interior (figure 1). The patient was completely asymptomatic and denied any abdominal and/or thoracic trauma history. The abdomen was plane, soft, depressible, painless when palpated and with no palpable masses. The haematological and biochemical tests were normal, including negative serologies for *E granulosus* and *Taenia solium* and were registered CEA values of 3.2 ng/mL and CA19.9 less than 1.2 U/mL. In order to achieve a better investigation, the patient was submitted to an abdominal MRI, which diagnosed the presence of a splenic cyst. She was then sent to a surgery appointment for therapeutic orientation.

The MRI revealed a multisepted and multiloculed cystic lesion with about 5 cm×3 cm, in upper polar intraparenchymal situation, with homogeneous hypersignal on T2 and homogeneous hyposignal on T1, with multiple thin septa, and not showing neither intravenous contrast capture nor wall nodules (figures 2 and 3).

With the diagnostic hypothesis of a 5 cm splenic cyst of uncertain aetiology in a young non-professional boxing fighter patient, surgery was proposed.

She went through a prophylactic therapy for 5 days with albendazole (400 mg, 1cp. 12/12 h) and prophylactic vaccination against type B *Haemophilus* (Hiberix—10 µg/0.5 mL), meningococcal infection (Meningitec—10 µg/0.5 mL) and an adsorbed conjugated pneumococcal vaccine (Prevenar 13—22 µg/0.5 mL).

TREATMENT

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Figure 1 Upper abdominal CT showing a cystic formation with about 5 cm, in an adjacent position to the anterior border of the spleen.

Figure 2 Abdominal nuclear MR showing a multisepted and multiloculed cystic lesion (5 cm×3 cm) in upper polar intraparenchymal situation.

The patient was submitted to a laparoscopic upper pole splenectomy. In this procedure, she was placed in right lateral decubitus position and a pneumoperitoneum with pressure of 11 mm Hg was achieved. Then, four trocars were placed (2×10 mm+2×5 mm): supraumbilical (camera 30°), epigastric and mid-clavicular line (grasper and Ultracision), and anterior axillary (exposure). After an abdominal inspection, the presence of a cyst on the upper pole of the spleen was confirmed, without adhesions (figure 4). The mobilisation of the gastric greater curvature was started with a need for a ligation of the short gastric vessels in order to have the possibility to address the splenic hilum for a following identification of the upper polar vessels. After the isolation of these it was then proceeded the ligation, under Ultracision, of the upper polar vessels that had previously been isolated. It was noted an almost immediate delimitation of the ischaemic area of the upper pole of the spleen, which encompassed the cyst. Then, a splenic transection about of 0.5 cm of the ischaemic border under coagulation with Ultracision and the placement of astringents was made with an effective haemostasis. After complete upper polar section, the specimen was put inside a bag.

Then, the splenic section area was lined in haemostatic Floseal. The specimen was extracted through the supraumbilical port (figure 5).

Figure 3 Abdominal nuclear MR: multisepted and multiloculed cystic lesion (5 cm×3 cm) in upper polar intraparenchymal situation.

Figure 4 Laparoscopic vision of the cyst shown in figures 1–3.

Figure 6 Histological scan—simple splenic cyst.

OUTCOME AND FOLLOW-UP

The immediate postoperative period went through with no complications. However, 2 days passed on the postoperative care and the patient developed an atelectasis at the right lung base, which was reverted under a kinesiotherapy process.

Histological examination of the surgical specimen has shown the presence of a fibrous-walled splenic cyst, partly lined by a layer of flattened cells with wall calcifications and surrounding parenchyma without any particularity. Definitive diagnosis was of a simple splenic cyst (figure 6).

DISCUSSION

Although the patient was asymptomatic and with an incidental finding in an imaging scan (which happens in the majority of the splenic cysts), this case stands out for its rarity and for the restricted number of cases treated by laparoscopy.³

The imaging scans that were made (CT and MRI) are representative of splenic cysts as being described in the literature (hypersignal at T2 and hyposignal at T1 with a liquid content in its interior, with no contrast capture on the nuclear MR). The identification of septa (more frequent in true cysts) and calcifications (more frequent in pseudocysts and neoplastic cysts) on the CT do not define the diagnosis.

The laboratory scans were normal. However, anaemia, granulocytopenia and thrombocytopenia may be shown in this context.⁴ Despite the rarity of this condition in large Portuguese

urban centres,⁹ hydatid disease must always be included in the differential diagnosis of splenic cysts.¹⁰ Since they present high sensitivity rates (85–90%),¹¹ negative serologies to *E granulosus* and *T solium* practically allow us to exclude the parasitic aetiology of the cyst. Nonetheless, as the definite diagnosis is anatomopathological, the patient carried out a presurgery therapy with albendazole. This treatment has to endure at least for 4 days before the procedure,^{1–12} its main objective being to weaken the recurrence risk, in case of a rupture of the cyst during the surgery, and to reduce its tension, enabling the surgical approach and consequently diminishing the associated risk of rupture and anaphylaxis.^{13–15}

The anatomopathological result has shown a simple splenic cyst, forming part of a set defined by the congenital or epithelial non-parasitic cysts, which comprises approximately 30% of true cysts.⁶ These are most frequently diagnosed in children and young adults and are associated with a good prognosis.⁶

The clinical evolution of these lesions is so diverse and difficult to predict that the choice of the appropriate moment for surgery is complex.¹⁶ Morgenstern and other authors consider that surgical treatment must be done in cases of symptomatic cysts or in those with a diameter larger than 5 cm.^{2–4 16 17} This happens because, on one hand, they present a higher risk of complications (such as infection, spontaneous or traumatic rupture and intracapsular haemorrhage)² and, on the other hand, a spontaneous resolution is less possible.⁴ Still, Arkuszewski *et al* defend a different approach: even when it is an incidentally diagnosed asymptomatic cyst, it should be handled surgically when the suspicion of a malign nature of the lesion is persistent.¹⁶ There are other authors who support this hypothesis, considering that the identification of septal calcifications on the CT—although not decisive to the diagnosis reinforces the need for surgery because of diagnostic doubt of malignity.⁶ However, others perceive that this imaging finding must not be an indication for surgical treatment.¹⁶ Hence, this doubt persists. Yet, since this patient is a boxer, we consider that sports practice (mainly the one associated with a high traumatic risk), by itself, must not be faced as an indication to a surgical intervention, but must be seen as a factor to consider in those cases when the doubt related to therapy approach persists.

There are several options for therapy for non-parasitic cysts. Nowadays, the best surgical technique for splenic cysts is not completely defined in the literature.¹¹ In the past, classical

Figure 5 Surgical specimen.

surgical approach to splenic cysts was a total open splenectomy, even in asymptomatic cases, intending to avoid complications (such as rupture, haemorrhage or infection). In this last decade, conservative surgical approaches with the preservation of the spleen have been further implemented, mainly in children and young adults.^{4–16} Currently, there are well-defined criteria for the choice of the surgery modality: location (relation with splenic vessels and remaining splenic parenchyma), number, size of the cysts, amount of remaining healthy splenic tissue,² pathogenesis of the cyst⁴ and patient's age.

Currently, the ideal candidate for a conservative surgery is considered to be a young patient with only one peripheral and small-sized cysts.^{2–4} This way, the splenic parenchyma may be preserved, keeping the immunological function (only 25% of the splenic parenchyma are necessary),⁴ reducing the risk of sepsis after a total splenectomy (4% in children and 1.9% in adults),¹¹ and gaining better mortality and morbidity results, as shown in a study made on patients with splenic hydatid cyst disease. In this study, those who were submitted to a total splenectomy had significantly higher mortality and morbidity rates (8.3% and 37.5%, respectively) when compared with those who were submitted to a conservative surgery (mortality: 0%; morbidity: 16.6%).¹⁸ Conclusively, it is showed that conservative surgery does not increase the risk of recurrence.²

There are numerous conservative techniques: partial splenectomy, marsupialisation, needlescopic operation technique and fenestration.⁴ A partial splenectomy was performed as it was a cyst located in the upper pole. It may be proper to say that in order to do a partial splenectomy a profound knowledge on splenic vascularisation is necessary. Two to eight terminal splenic artery branches are usually found and the segmentation and subsegmentation of the splenic artery might occur in or outside the spleen.¹⁹ Plus, the upper pole artery is present in only 65% of the cases,¹⁹ making its identification a crucial step towards the accomplishment of the upper pole splenectomy. Owing to diagnostic doubt (malignancy/hydatid) enucleation (higher rupture risk) and deroofting were not considered.

Currently, there is an increasing use of minimal invasive surgical approaches with preservation of the spleen. This fact relates to the progress of laparoscopic techniques, as well as to its best usage from surgeons.² It also allows less morbidity, less blood loss during the procedure, less pain in the postoperative period, shorter hospitalisations, with a faster recovery and with an earlier return to daily activities, as well as a more satisfying aesthetic result. Fewer postoperative complications are expected (infection, surgical wound dehiscence, pleural effusion and peritoneal adhesions).^{2–4 6 18 19}

In this case, an upper pole laparoscopic splenectomy was made. Such a procedure has been registered only eight times in the international literature: two in adults (one with an epidermoid cyst² and another with a fragmentation of the upper pole after a trauma¹⁹) and six in children (five with haematological diseases—four with hereditary spherocytosis and one with haemoglobinopathy E; and the other with a haemangioma²⁰). This was the first surgery in a simple splenic cyst.

Learning points

- Splenic cysts are accidental findings in the context of an asymptomatic clinical presentation. Splenic cysts larger than 5 cm or symptomatic must be treated with surgery
- Effort should be made to preserve as much splenic parenchyma as possible (at least 25%).
- Partial splenectomy is an acceptable procedure in the majority of the cases of unique splenic cysts.
- The laparoscopic approach may be carried through safely, with all the benefits of a minimal invasive approach.

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