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Beyond the immediate: Splenic pseudocyst as a rare delayed complication of blunt abdominal trauma: A case report

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Abstract
Splenic pseudocysts are an extremely uncommon condition. Cysts of the spleen can be categorized into parasitic and non-parasitic. Most of these cysts are asymptomatic. We report a fascinating unusual case of a giant splenic pseudocyst developed secondary to past abdominal trauma.
A 47-year-old gentleman presented with a gradually progressive abdominal lump in left upper abdomen for the past four months associated with dull aching pain with a history of blunt trauma abdomen one year back. On examination, 25 X 18 cm non tender swelling was present in the left hypochondrium, extending up to the umbilicus. Ultrasonography and CECT Abdomen showed a well-defined non enhancing hypodense lesion of size 16X14X21 cm in spleen. Hydatid serology was negative, but he was found to have JAK 2 mutation. Patient was taken up for laparotomy in which 26X19X13 cm of spleen was removed which was adherent to the left dome of the diaphragm. Excision of spleen created a rent in diaphragm which was managed by primary repair with mesh placement and left ICD insertion. Excised cyst of the spleen was filled with around 2.5 liters of pus and histopathology report confirmed the diagnosis of pseudocyst of spleen.
Huge size of splenic pseudocyst produced symptoms in this case. Such cases can be managed with either conservative or radical surgical approach. Treatment can be individualized on the basis of cyst location, cyst size, and the residual splenic parenchyma.
The aim of splenic pseudocysts management is prompt diagnosis, symptomatic relief and prevent complications. Management varies from cyst aspiration to splenectomy.

Keywords: Post-traumatic, spleen, pseudocyst, splenic trauma, jak 2 mutation

Introduction
Splenic cysts are exceptionally rare, with an incidence of approximately 0.07% in the general population [1]. Among the roughly 800 cases reported worldwide, splenic pseudocysts represent a particularly uncommon subtype [2], especially when presenting with significant delayed enlargement following trauma. Cysts of the spleen are classified as parasitic and non-parasitic or etiologically as congenital, inflammatory, vascular, post traumatic or neoplastic cysts [3]. Non parasitic cysts are further classified as true cysts and pseudocysts in reference to the presence or absence of surface epithelium. True cysts have an epithelium lining, which is lacking in pseudocysts. True cysts include epidermoid, epithelial, or congenital cysts [3,4]. These acellular cysts typically develop as a sequela of trauma, infarction, or infection, resulting from the liquefaction of an intraparenchymal hematoma or necrotic tissue.

Case Report
A 47-year-old gentleman presented to the surgical clinic with a gradually progressive abdominal lump in left upper abdomen for the past four months associated with dull aching pain. He had a history of blunt trauma abdomen one year back when he fell from a rickshaw over the left side of his body. On examination, 25 X 18 cm non tender swelling was present in the left hypochondrium, extending up to the umbilicus which was soft in consistency with a smooth surface and well-defined margins. Ultrasonography of the abdomen suggested a large thick-walled cystic lesion in the left hypochondrium and left lumbar region. CECT Abdomen showed a well-defined non enhancing hypodense lesion of size 21X16X14 cm as shown in Figure 1.

Lesion was homogenous without any internal septations or calcifications within the cyst wall with no evidence of old splenic injury or hematoma within the spleen with fat planes lost by the diaphragm. Hydatid serology was negative. Hemogram revealed Polycythemia (Hb-18gm/dl and Hematocrit-57%). On further hematological evaluation, he was found to have JAK 2 mutation. Patient was given preoperative vaccination in line with recommendations of the Centre of Disease Control and Prevention (CDC). Patient was taken up for laparotomy in which 26X19X13 cm of spleen was removed which was adherent to the left dome of the diaphragm as shown in Figure 2. Excision of spleen created a rent in diaphragm which was managed by primary repair with mesh placement and left ICD insertion. The excised cyst of the spleen was filled with around 2.5 liters of pus (which was sterile on culture) and histopathology report confirmed the diagnosis of pseudocyst of spleen (fibrous wall lacking an epithelial lining, with evidence of hemosiderin-laden macrophages, or chronic inflammatory cells). Patient was discharged on postoperative day 5 with a smooth recovery and at 3-month follow-up, the patient remained asymptomatic.

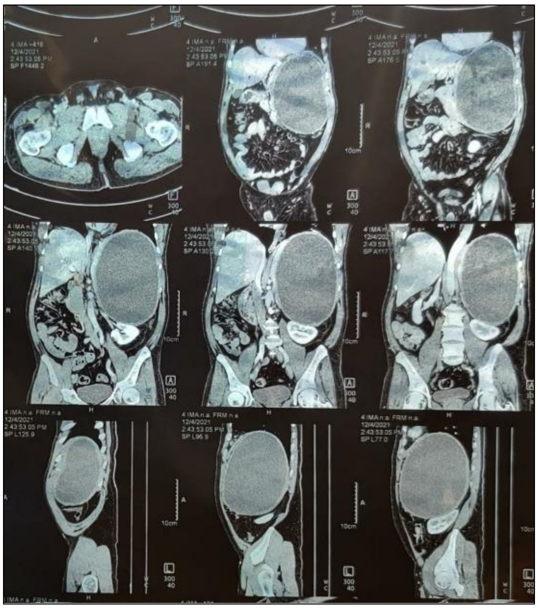

Fig 1: CECT Abdomen showing huge well defined non enhancing hypodense lesion in spleen.

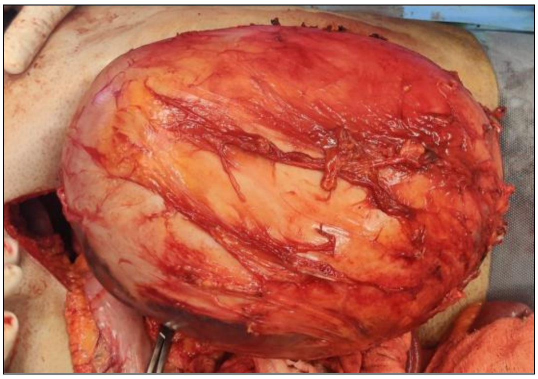

Fig 2: Intraoperative image of splenic pseudocyst.

Discussion

Pseudocysts of spleen are rare in clinical practice. They usually develop secondary to trauma [5]. False splenic cysts or the pseudocysts comprise 75% of the non-parasitic cyst. Pseudocysts lack a lining epithelium and thus are differentiated from the true cysts in histology [4]. Pathogenesis of cysts of the spleen is yet to be discerned. Resolved and liquified hematoma as a result of abdominal trauma is thought to give rise to pseudocysts of spleen but can also be an outcome of infection or degeneration also [4]. In the present case, the cyst could be a consequence of resolved hematoma due to antecedent trauma.

Most splenic pseudocysts (30-60%) are asymptomatic, leading to incidental diagnosis in the majority of reported cases due to the lack of specific clinical symptoms in their early stages [2]. However, as observed in our patient, oversized cysts tend to be symptomatic [1]. Clinical presentation often correlates with the cyst's size and location, commonly manifesting as atypical pain, heaviness in the left hypochondrium due to distension of the splenic capsule, or a palpable mass due to space-occupying effects [1]. Large splenic pseudocysts are prone to serious complications, including sudden increase in size due to intracystic bleeding, secondary infection, and spontaneous intraperitoneal rupture [1, 2, 6]. Cowles *et al*. reported a complication rate of 5.2% among 191 cases, primarily due to rupture and infection [1, 7].

Our 47-year-old patient presented with a markedly enlarged splenic pseudocyst, approximately 26x19x13 cm upon excision as shown in Figure 3, manifesting as a gradually progressive abdominal lump and dull aching pain. This presented as a delayed complication, notably occurring one year after a blunt abdominal trauma, underscoring the insidious nature and potential for delayed symptomatic development of these lesions. A particularly critical finding was that the excised cyst was filled with approximately 2.5 liters of purulent material as shown in Figure 4, strongly indicating secondary infection or a significant inflammatory process. The presence of pus critically influenced the management strategy.

Fig 3: Resected specimen of Pseudocyst of Spleen.

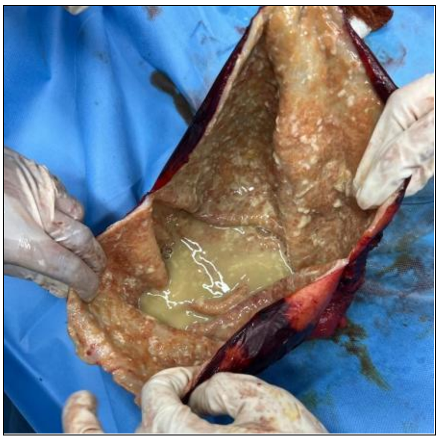

Fig 4: Cut open section of the resected Pseudocyst of spleen which was filled with 2.5 litres of purulent material.

A unique and intriguing aspect of this case was the concurrent diagnosis of polycythemia (Hb-18gm/dl, Hct-57%) with a confirmed JAK2 mutation. While a direct causal link between JAK2-positive myeloproliferative neoplasms and the formation or accelerated enlargement of splenic pseudocysts has not been clearly established in the existing literature, it presents a compelling area for speculation. Myeloproliferative neoplasms, driven by JAK2 mutation, can induce splenomegaly and alter splenic architecture, potentially predisposing the spleen to injury or affecting hematoma resolution, thereby possibly contributing to the development or substantial growth of such cysts. The presence of polycythemia also necessitated careful preoperative hematological assessment and management, including appropriate vaccination prior to splenectomy, to mitigate potential surgical risks such as thrombosis or bleeding.

The massive size of the pseudocyst and its dense adherence to the left dome of the diaphragm posed significant surgical challenges. During total splenectomy, an iatrogenic rent was created in the diaphragm, a known but rare complication in complex splenic resections involving extensive adhesions. This required meticulous primary repair with mesh placement and subsequent left intercostal drain insertion, highlighting the demanding nature of managing such giant, adherent lesions.

Regarding treatment, while spleen-preserving techniques like percutaneous drainage, marsupialization, splenic decapsulisation, and complete cystectomy with partial splenectomy have recently been attempted for smaller, uncomplicated cysts, total splenectomy remains the gold standard [8]. In our patient's case, the massive size, extensive adhesions, and critically, the presence of purulent material, mandated a total splenectomy. Conservative approaches would have been inadequate and carried significantly higher risks of incomplete resection, recurrence, or persistent infection. Following surgery, the patient had a smooth postoperative recovery, indicating successful resolution of the complex pathology.

Conclusion

This case highlights the rare occurrence of a massive, infected post-traumatic splenic pseudocyst presenting as a delayed complication of blunt abdominal trauma. Its complexity was further compounded by an underlying JAK2 mutation and associated polycythemia, posing an intriguing question as to whether this mutation acted as a catalyst for the cyst's growth or was merely an associated finding. The primary goal in treating splenic pseudocysts is to relieve symptoms and prevent dreadful complications, necessitating a high degree of clinical suspicion, awareness of their varied clinical presentation, and robust pathological expertise for accurate diagnosis. This report underscores the significant challenges in both the differential diagnosis and surgical management of such giant, adherent, and potentially infected splenic masses, emphasizing the critical need for comprehensive preoperative evaluation, meticulous intraoperative technique, and thorough consideration of unique co-morbidities, alongside diligent follow-up with serial imaging for patients with conservatively managed splenic injuries to avert such severe outcomes.

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