The role of percutaneous US-guided drainage in the treatment of splenic abscess.

Case report and review of the literature

Ann. Ital. Chir., 2012 83: 433-436
Aheadofprint 27 December 2011
www.annitalchir.com - pii: S0003469X11018288

Giovanni Conzo, Giovanni Docimo, Antonietta Palazzo, Cristina Della Pietra, Francesco Stanzione, Valerio Sciascia, Luigi Santini

VII Divisione di Chirurgia Generale, Dipartimento di Scienze Anestesiologiche, Chirurgiche e dell'Emergenza, Seconda Università degli Studi di Napoli, Italia

The role of percutaneous US-guided drainage in the treatment of splenic abscess. Case report and review of the literature

Splenic abscess is an uncommon but potentially life-threatening disease that generally occurs in patients with neoplasia, immunodeficiency, hemoglobinopathies, trauma, metastatic infection, splenic infarction and diabetes. Splenic abscess should be considered in a patient with fever, left upper abdominal pain, and leukocytosis. Splenectomy has been the gold standard treatment for splenic abscess, however, burdened by high morbidity rate related clinical conditions of the patient. With the recent development of minimally invasive techniques and percutaneous US- or CT-guided procedures, the placement of a drainage has achieved excellent results with resolution of the disease in a high percentage of cases with low morbidity and negligible mortality.
Percutaneous drainage is indicated for uniloculated or biloculated abscesses and for high risk surgical patients. It is a reliable technique with a high rate of therapeutical success and low costs compared to surgery. Other advantages include avoiding risks of intra-abdominal spillage and perioperative complications and saving time, along with a better patient compliance and an easier nursing care. The authors describe a case of splenic abscess treated by percutaneous US-guided drainage. Our results suggest that ultrasound-guided percutaneous drainage is a safe and feasible alternative to surgery in the treatment of splenic abscesses. In addition, it allows spleen preservation.

KEY WORDS: Immunodeficiency, Hemoglobinopathies, Splenic abscess, Ultrasound.

Introduction

Splenic abscess (SA) is an uncommon disease, with a reported incidence of 0.14-0.7% in autopsies in Western countries and a dismal prognosis if not properly treated [1,2]. In Tropical countries, where sickle cells anaemia is widespread, SA shows a higher incidence related to the fact that patients have a predisposition to splenic infarction due to splenic vein thrombosis.

The first historical evidence of SA dates back to Hippocrates, who pointed out the peculiar features of this pathology. Only by the end of 19th century, more precisely in 1885, it is possible to find the first 57-cases series in literature reported by Grand-Moursel [3].

Nowadays, diagnosis is based on US examination and can be possibly completed by CT-scan, selective angiography and ^{99}TC-labeled scintigraphy, which permits a differential diagnosis with other affections as subphrenic and pancreatic abscesses.

In the past, splenectomy was considered the only treatment of such septic complications, with a low mortali-

Pervenuto in Redazione Settembre 2011. Accettato per la pubblicazione Novembre 2011
Correspondence to: Giovanni Conzo, MD, Aggregate Professor of General Surgery, VII Division of General Surgery, Dipartimento di scienze Anestesiologiche, Chirurgiche e dell'Emergenza, Second University of Naples, Via Pansini 5, Ed. 17- 80131 Naples, Italy (e-mail: giovanni.conzo@unina2.it).

ty rate but a relatively high morbility related to patient's general conditions [4-7].
With the recent development of percutaneous US- and CT-guided techniques, the placement of a drainage has gained excellent results with complete recovery of the patients in a high percentage of cases [8-14].
The authors describe a case of a patient treated by percutaneous US-guided drainage followed by the complete resolution of symptomatology.

Case report

In December 2008, a 75-year-old male patient came to our observation with an history of ischemic cerebro-vascular disease, chronic gastritis and right kidney cyst. He had been previously hospitalized for an inflammatory Vater papilla stricture, with high cholestasis laboratory tests, successfully treated by endoscopic sphincterotomy in December 2007.
He was admitted to our institution with a septic fever and dyspepsia. Jaundice, right upper quadrant and epigastrium pain, along with obnubilation and poor general conditions were also observed. The patient was affected by atrial fibrillation with medium ventricular response associated with aspecific abnormalities in repolarization phase.
An abdominal contrast-enhanced CT-scan showed a 10 cm diameter bulky abscess in the inferior pole of the spleen (Fig. 1) and a left basal pleural effusion associated with atelectasis.
The patient underwent US-guided positioning of a nephrostomy catheter Nephrofix®certo (Ch. 14/4-6mm B/Braun-Germany) into the abscess cavity through an intercostal access, and 250cc of purulent material was drained. The abscess culture resulted positive for E. Coli and other gram negative pathogens.
The patient underwent antibiotic therapy with Piperacillin + Tazobactam (2,2g x 3/die) for 14 days and Netilmicin (300mg/die) for 5 days, on an antibiogram basis.
A CT scan performed 8 days after US-guided drainage, showed a 90% decrease of the abscess cavity, and remarkable reduction of omolateral pleural effusion, with fast resolution of general conditions and complete remission of the symptomatology.

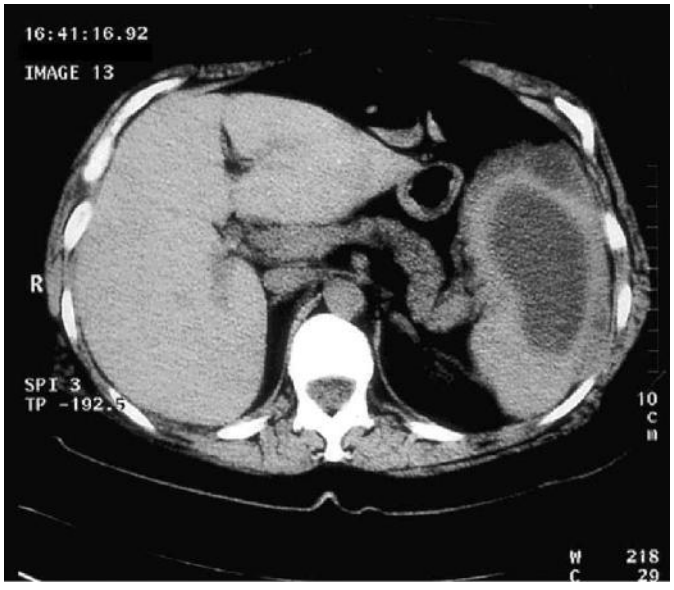

Fig. 1: CT scan showing 10 cm diameter bulky abscess at the inferior pole of the spleen.

Discussion

SA is a rare clinical entity, mostly observed either in oncological, traumatized, diabetic and immuno-deficient patients or in cases of splenic infarction. Antibiotic therapy, splenectomy and percutaneous drainage show good results, nevertheless debate is ongoing for what has to be considered the most suitable treatment, which eventually depends on the general patient conditions.
On an etiopathogenetic point of view, SA presentation is secondary to different pathologies:

1) *Infections of other anatomical sites*: most frequent causes are bacteriemia from endocarditis (especially in intravenous drug users), intrabdominal abscesses, commonly from stomach and small bowel surgery, osteomyelitis, intravenous access infections, skin lesions and tooth extraction.
2) *Infections transmitted from contiguous sites* , such as perirenal abscess or direct involvement from colon cancer. Conversely, a splenic disease may involve adjacent organs resulting in secondary contamination (such as stomach involvement from a splenic lymphoma). A SA can sometimes be caused either by retrograde portal infection due to HCC alcoholization or sclerotherapy for the treatment of oesophageal varices.
3) *Abscess development on a pre-existing embolic spleen infarction,* in patients affected by cardiac arrythmias, bacterial endocarditis, leukemia, thrombocitosis, pancreatitis or under treatment for sickle cells anaemia.
4) *Iatrogenic spleen lesions or traumas,* during gastric surgery, spleen-preserving distal pancreatectomies, CPRE or percutaneous nephrostomy.
5) *Immunodeficiency* represents a high risk condition, especially when fungi and other less frequent microrganisms are involved. Other high risk affections are LES, Felty syndrome, kidney failure, mononucleosis, multiple mieloma and leukemias. This infection is also frequent in intravenous drug users affected by AIDS, as well as in patients with neutropenia caused by chemotherapy. The most frequent pathogens are streptococcus and Escherichia Coli, though M. Tubercolosis and S. Tiphy are frequently found in other geographical areas.
SA can show up either as micro-abscesses or as a volu-

minous single abscess, thus conditioning therapeutic protocols.
Micro-abscesses are defined as small pus spots < 1 cm in diameter; they can be a splenic manifestation of an inveterate and generalized septic process. If medical therapy fails, splenectomy remains the gold standard.
A "true abscess" is a single or multiple collections > 1 cm in diameter.
Primary abscesses are suppurative collections which may develop primary in the spleen, even if already affected by other diseases. When the primary site of infection is unknown, the abscesses are defined "cryptogenic" (they may develop during CPRE procedures and sclerotherapy for oesophageal varices).
Diagnosis may be difficult and, if not prompt, could possibly lead to a dismal prognosis.
Commonly, patients report fever and other more aspecific symptoms (Tab. I). Some typical onsets are left thoracic pain, dispnoea, pleural reaction and effusion, spontaneous or provoked left upper abdominal pain, abdominal tenderness and splenomegaly. A third of the patients present to clinical observation with a typical triad:
– Fever;
– Left upper abdominal pain;
– Palpable left upper abdominal swelling.
SA presents at US examination as an intensely hypoechoic or anechoic, dishomogeneous, focal, unique or multiple lesions with mild internal echoes.
The absence of a proper capsule can differentiate SA from epidermoid cyst.
Nevertheless, diagnostic accuracy is approximately 75% because differential diagnosis with neoplasms and splenic infarction can be difficult. According to some authors, contrast-enhanced CT-scan represents a first line test for an adequate assessment of the disease, it achieves a correct diagnosis in 92-96% of cases, detecting collection < 1cm in diameter. Scintigraphy with labelled markers (Tc, Ga, I) might result useful as well.
With regard to the treatment of SA, antibiotic therapy, splenectomy, and percutaneous drainage must be taken into consideration on the basis of disease entity, patient conditions and, above all, type of collection (micro-abscesses, true abscess, etc.) [1,2,16-18], because mortality rate is more strictly related to patient conditions than to modality of treatment.
Medical therapy can be effective in miliar abscess, which is spread, in some cases, to the whole parenchyma with a maximum diameter of 2 cm (Mycobacterium ovini infection), whilst splenectomy can be considered in no responders, basically patients affected by immunodeficiency [5,8]. Until recently, single or double abscesses, originating either from hematogeneous diffusion or contiguity to septic collections, were treated by splenectomy. Such intervention does not aid patients with severe hemodynamic and metabolic instability, in advanced septic status. Most recent data from literature suggest a more conservative treatment, such as US- or CT-guided drainage[1,2,8,18,19]. By these means it appears feasible to evacuate the abscess in order to perform a cultural examination and wash out the cavity. This technique is indicated in liquid content unilocular collections, in absence of internal septa. Anyway, some contraindications are to be considered: hemorragic syndromes, suspected rupture of the abscessual cavity, multiple septa inside the cavity, ascites, abscess detected near the splenic hilum or in a high risk zone for pleural lesions as well.
Ooi et al. report unilocular abscess without internal septa as a correct indication for percutaneous CT-guided drainage[6].
Furman and Morgenstern reported a case of SA on a subcapsular hematoma incidental to CPRE with papillotomy, which was treated with CT-guided percutaneous drainage associated to 8-days antibiotic therapy followed by complete remission[20].

TABLE I - *Clinical Presentation*

	Fever (%)	Pain (%)	Splenomegaly (%)	Left Pleural Effusion(%)
Chun et al.	95.4	42.1	53.9	19.7
Neiken et al.	84	39	40	20
Ooi et al	90.8	49.8	30.7	22.3

Conclusions

The treatment of choice for SA is still issue of debate, but should probably depend on a multifactorial analysis – etiology, patient conditions, size and location of the abscess. Mortality depends on patient conditions and comorbilities rather than on therapeutical approach. Percutaneous US-guided drainage of SA is a simple and safe procedure with a low morbility, which can prevent selected patients from undergoing splenectomy. Yet, splenectomy is considered the gold-standard treatment in miliar and symptomatic abscess, and should be performed in all critical patients with severe comorbidities. Abscess drainage has to be performed under strict observation to prevent potential complications such as bleeding, which might request an urgent surgical intervention. Major complications are bleeding, pneumothorax, pleural empyema, and visceral perforation. With regard to long-term results, such conservative procedure along with a proper antibiotic therapy might lead to complete recovery of selected patients in a high percentage of cases, and could possibly become a preliminary step to a delayed splenectomy.

Riassunto

L'ascesso splenico è una patologia non frequente ma potenzialmente pericolosa quoad vitam, che generalmen-

te si manifesta in pazienti con neoplasie, deficienze immunitarie, emoglobinopatie, traumi, infezioni metastatiche, infarto splenico e diabete. La sua esistenza deve essere presa in considerazione in un paziente con febbre, dolore addominale e leucocitosi. La splenectomia ha rappresentato il gold standard per gli ascessi splenici, peraltro gravata da una elevata morbilità correlata alla condizione generale del paziente.
Con il recente sviluppo delle tecniche mininvasive e delle procedure percutanee guidate dall'ecografia o dalla TAC, l'apposizione di un drenaggio ha raggiunto risultati eccellenti con risoluzione della patologia in un'elevata percentuale di casi, con bassa morbilità e trascurabile mortalità.
Il drenaggio percutaneo è indicato per gli ascessi uniloculari o biloculari e per i pazienti ad alto rischio. Si tratta di una tecnica affidabile con elevata percentuale di successo terapeutico e bassi costi, se paragonata alla chirurgia. Altri vantaggi comprendono il poter evitare i rischi di uno spandimento intra-addominale e di complicazioni postoperatorie, con risparmio di tempo che si associa ad una migliore disponibilità da parte del paziente ed una facile gestione.
Gli autori descrivono un caso di ascesso splenico trattato con drenaggio percutaneo eco-guidato. I risultati suggeriscono che il drenaggio percutaneo eco-guidato rappresenta un'alternativa alla chirurgia per il trattamento degli ascessi splenici, consentendo la conservazione della milza.

Aknowledgement

The Authors are indebted with Giuseppina Casalino and Claudio Mauriello for their collaboration to the material preparation of the paper.

References

1. Lee WS, Choi ST, Kim KK: *Splenic abscess: A single institution study and review of the literature.* Yonsei Med J, 2011; 52(2):288-92.

2. Ferraioli G, Brunetti E, Gulizia R, Mariani G, Marone P, Filice C: *Management of splenic abscess: Report on 16 cases from a single center*. I J Infect Dis, 2009; 13:524-30.

3. Grand-Moursel PE: *Contribution a l'etude abces de la rate*. These de Paris, 1885.

4. Iñiguez A, Butte JM, Zuñiga JM, Torres J, Llanos O. *Splenic abscesses. Report of seven cases*. Rev Med Chil. 2008; 136(1):38-43. Epub 2008, Review. Spanish.

5. Burnier C, Ribordy-Baudat V, Lamy O: *Splenic abscess: etiology, diagnosis and possible therapeutics*. Praxis (Bern 1994). 2007; 96(44):1731-735. French.

6. Ooi LL, Nambiar R, Rauff A, Mack PO, Yap TL: *Splenic abscess.* Aust N Z J Surg,1992; 62:780-84.

7. Tung CC, Chen FC, Lo CJ: *Splenic abscess: an easily overlooked disease?* Am Surg, 2006; 72:322-25.

8. Meneses-Grasa Z, León-Rosique M, Coll-Salinas A, Carpena-Martínez I, Aguayo-Albasini JL: *Splenic abscess in an intravenous drug user: resolution with ultrasound-guided drainage*. Cir Esp, 2009; 86(4):257-59.

9. Kogo H, Yoshida H, Marnada Y, Taniai N, Bando K, Mizuguchi Y, Ishikawa Y, Yokornuro S, Akirnaru K, Tajirí T: *Successful percutaneous ultrasound guided draínage for treatment of a splenic abscess.* J Nippon Med Sch, 2007; 74(3):257-60.

10. Zerem E, Bergsland J: *Utrasound guided percutaneous treatment for spienic abscesses: The significance in treatment of critically ili patients.* World J Gastroenterol, 2006; 12(45):7341-5.

11. Chou YH, Hsu CC, Tiu CM, Chang T: *Splenic abscess: Sonographic diagnosis and percutaneous drainage or aspiration.* Gastrointest Radiol, 1992; 17:262-66.

12. Ralis PW, Quinn MF, Colletti P, Lapin SA, HalIs J: *Sonography of pyogenic spleníc abscess.* AIR Am J Roentgenol, 1982; 138:523-25.

13. Kang M, Saxena AK, Gulati M, Suri S: *Ultrasound guided percutaneous catheter drainage of splenic abscess.* Pediatr Radiol, 2004; 34:271-73.

14. Thanos L, Dailiana T, Papaioannou G, Nikita A, Koutrouvelis H, Kelekis DA: *Percutaneous CT-guided drainage of splenic abscess.* AJR Am J Roentgenol, 2002; 179:629-32.

15. Cohen MAA, Galera MJ ,et al .:*Splenic abscess*. WJ Surg, 1990; 14(4):513-16.

16. Llenas-García J, Fernández-Ruiz M, Caurcel L, Enguita-Valls A, Vila-Santos J, Guerra-Vales JM: *Splenic abscess: a review of 22 cases in a single institution.* Eur J Intern Med, 2009; 20(5):537-39.

17. Docimo L, Gubitosi A, Docimo G, Scotto di Mase G, Pacifico F: *L'ascesso splenico.* Chirurgia, 1996; 9:1-3.

18. Kosul'nikov SO, Karpenko SI, Lobanov AA, Kravchenko KV, Tarnopol'skiT SA: *The splenic abscess: alternative surgery.* Klin Khir, 2008; (2):22-23. Russian.

19. Choudhury SR, Debnath PR, Jain P, Kushwaha AS, Puri A, Chadha R, Sonker P: *Conservative management of isolated splenic abscess in children.* J Pediatr Surg, 2010; 45(2):372-75.

20. Furman G,Morgenstern L: *Splenic injury and abscess complicating endoscopic retrograde cholangiopancreatography.* Surgical Endoscopy, 1993; 7(4):343-44.

21. Gary Furman G,Morgenstern L: *Splenic injury and abscess complicating endoscopic retrograde cholangiopancreatography.* Surgical Endoscopy, 1993; 7(4):343-44.