

Splenic Infarction, rare cause of acute abdomen, only seldom requires splenectomy.

Case report and literature review



Ann. Ital. Chir., 2007; 78: 529-532



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Splenic infarction, rare cause of acute abdomen, seldom requires splenectomy. Case report and review of the literature

Splenic infarction is a rare disorder, commonly without a characteristic symptomatology, that rarely requires surgical procedure; in fact it has the peculiar feature of an high tendency for complete healing after the only medical approach. Furthermore in order to prevent OPSI, only in case of clear, persistent symptoms or complications it may be necessary surgical laparoscopic or open approach.

The Authors report on a recent case observed in emergency of splenic infarction with infectious complications that made the surgical procedure mandatory.

KEY WORDS: OPSI, Splenic infarction, Splenectomy, Wandering spleen.

Introduction

Splenic infarction (SI) represents a rare disorder, only a few time responsible of an acute abdomen; SI rarely requires splenectomy.

Many etiologies can lead to SI, usually related to vascular or haematologic abnormalities, or infections. As a matter of fact in medical literature most cases of SI are occurred during or in consequence of polycythemia, sickle cell anemia, myeloproliferative diseases, paroxysmal nocturnal hemoglobinuria (PNH), acute malaria, aspergillosis, meningococcal septicemia and acute Brucella mellitensis infection¹⁻⁵, while is common manifestation of cardiac thromboembolism in patients with atrial fibrillation or endocarditis.

Sometime SI is caused by hypercoagulable state tumor

associated⁶ and it was observed in blunt splenic trauma too⁷. Finally splenic infarct may be the last consequence of a wandering spleen with torsion of the vascular pedicle.

Background

Despite the numerous anatomical variations of the splenic artery in origin, course and terminal branching pattern, it is a truth universally accepted that lobar arteries do not anastomose with each other so that the lobes of the spleen are termed segments⁸⁻¹¹. This peculiarity thereby makes conservative surgery of the spleen possible, by partial splenectomy, also by laparoscopic approach¹²⁻¹⁴. On the other hand therefore the stop of blood flow in this district, both arterious and venous, can determine an infarct of the spleen¹⁵, that luckily only a few time is extended to all the splenic parenchyma, while usually it is limited to one segment or pole. It is well known in fact that also after splenic vessels ligation, the upper splenic pole remains vascularized by short vessels through the gastro-splenic ligament, while the lower splenic pole

Pervenuto in Redazione Febbraio 2007. Accettato per la pubblicazione Giugno 2007.

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remains vascularized by the left gastro-epiploic artery ¹⁶. Also in case of trauma, in fact, splenic artery ligation combined with either splenorraphy or partial splenectomy has been used as a spleen saving procedure without postoperative complications and with immunological and functional healing ¹⁷.

Only in the case of wandering spleen, due to absence or laxity of the various ligaments supporting the spleen, we can have completely obstruction of all blood supply and if there is a delay in the surgical operation (splenopexy or splenectomy), necrosis of the whole spleen is the rule ^{18,19}.

Case report

75-year-old female who had chronic myelogenous leukaemia; she was observed in the Emergency Department of our hospital complaining of severe acute abdominal pain of few hours duration in the left upper quadrant. She had fever and vomiting, and she was in fairly good general conditions for her age and her pre-existent haematological disease. The physical examination revealed intense tenderness to palpation in the epigastric and left hypochondriac region. Routine blood tests were within normal limits unless leukocytosis. The patient therefore underwent abdominal spiral computerized tomography with and without i.v. iodinated contrast medium and she was found to have SI. According to usual management she was first treated medically with hydration, antibiotics, analgesia and low molecular weight heparin s.c., but the development of several abscess was observed on subsequent CT scan three days later.

The patient in order to prevent splenic rupture associated with high mortality that may occur during infarct complicated by abscess formation underwent splenectomy, but unfortunately she died few days later by arising cardiovascular and infectious complications.

Discussion

Except in case of wandering spleen with vascular pedicle torsion, in the other most cases SI is quite completely asymptomatic with the exception, sometimes, of left hypochondrial pain, rarely fever, tachycardia, nausea and vomiting, whereas it is occasionally diagnosed in the course of the assessment for others pathologies, frequently haematological disorders ^{20,21}. For some Authors on the contrary symptoms are present in almost 70% of the patients including constantly abdominal pain, fever and constitutional symptoms ²², changes in the blood count including anemia, leukocytosis, thrombocytosis and an increase in LDH and CPK concentrations.

Anyhow SI rarely develops into abscesses, pseudocysts, hemorrhage, subcapsular haematoma or splenic rupture,

in fact usually evolution of ischemic tissue is through the fibrosis and it is characterized by a high tendency for complete and adequate healing without necessity therefore of splenectomy.

This consideration has a great prognostic value because the residual splenic tissue is very important in order to prevent infections; it is demonstrated in fact that after splenectomy patients have an increased risk of overwhelming post-splenectomy infections (OPSI), or sepsis involving encapsulated bacteria such as pneumococci ²³, or haemophilus influenza and type B, and Neisseria, especially observed among children with hematological disorders ²⁴.

Patients are diagnosed with SI by color Doppler sonography (CDS) or by contrast-enhanced helical computed tomography (CT) ^{25,26}, or at last by angiography with demonstration of wedge-shaped regions of decreased perfusion. In most cases a decrease in SI on follow-up CT will demonstrate resolution without clinical sequelae ²⁷. In other cases splenic abscesses or delayed rupture may occur and infection may be demonstrated by the presence of air within the areas of infarction or subcapsular air/fluid levels, with possibility of drainage and cultures with splenic preservation or otherwise positivity for infection that together with clinical signs make splenectomy mandatory ²⁸.

Conclusions

Splenic infarction is a main problem of splenic pathology and it is a complication related to several serious disorders, but it is also characterized by a high tendency for complete healing, so that in uncomplicated splenic infarction management is usually restricted to close clinical monitoring, hydration, antibiotics, analgesia and low molecular weight heparin s.c. and aspirin, with resolution of symptoms in 1 to 2 weeks, while imaging abnormalities resolve in the most cases within a few months without clinical sequelae ²⁹⁻³¹.

In order to prevent OPSI, only in case of persistent symptoms or complications (splenic abscess or delayed rupture) it may be necessary surgical, laparoscopic or open, approach ^{32,33}. In these last cases, where it is possible, splenic autotransplant must be done ^{34,35} or otherwise it is recommended vaccination with the 7 valent pneumococcal conjugate vaccine and the 23 valent polysaccharide vaccine ³⁶.

Riassunto

L'infarto splenico è una patologia di raro riscontro, che si presenta solitamente senza una sintomatologia caratteristica e che raramente richiede un intervento chirurgico; infatti solitamente ha un'alta tendenza alla guarigione anche dopo il solo trattamento medico.

Inoltre proprio al fine di prevenire l'OPSI, solo in caso di sintomi evidenti e persistenti o per l'insorgenza di complicanze può essere necessario l'approccio chirurgico, laparoscopico o laparotomico.

Viene descritto un caso di infarto splenico, recentemente osservato in urgenza, con complicanze infettive che hanno reso inevitabile l'intervento chirurgico.



Fig. 1: Splenic infarction in 75-year-old female affected by chronic myelogenous leukaemia.

References

- 1) Mazal B, Amital H, Barkan D, Shaham D, Leitersdorf E: *Splenic infarction as an unusual cause of left pleural effusion*. Harefuah, 2004; 143(8):563-65, 623.
- 2) Tsatalas C, Margaritis D, Pantelidou D, Kotsianidis I, Karayiannakis AJ, Spanoudakis E, Kartasis Z, Kaloutsis V, Polychronidis A, Manavis I, Bourikas G: *Splenectomy for massive splenic infarction unmasks paroxysmal nocturnal hemoglobinuria*. Acta Haematol, 2003; 110(4):193-96.
- 3) Meuwly JY, Vial Y, Vuilleumier H, Schnyder P, Hewig U: *Ultrasound of non traumatic acute abdomen: Extra-digestive causes*. Ultraschall Med, 2002; 23(5):301-10.
- 4) Hatakeyama S, Kimura A, Kashiya T: *Meningococcemia complicated by disseminated intravascular coagulation, splenic infarction and pulmonary thromboembolism in a young adult: case report*. Kansenshogaku Zasshi, 2001; 75(4):345-49.
- 5) Salgado F, Grana M, Ferrer V, Lara A, Fuentes T: *Splenic infarction associated with acute Brucella mellitensis infection*. Eur J Clin Microbiol Infect Dis, 2002; 21(1):63-64.
- 6) Gorg C, Zugmaier G: *Chronic recurring infarction of the spleen: sonographic patterns and complications*. Ultraschall Med, 2003; 24(4):245-49.
- 7) Romano S, Scaglione M, Gatta G, Lombardo P, Stavolo C, Romano L, Grassi R: *Association of splenic and renal infarctions in acute abdominal emergencies*. Eur J Radiol, 2004; 50(1):48-58.
- 8) Pandey SK, Bhattacharya S, Mishra RN, Shukla VK: *Anatomical variations of the splenic artery and its clinical implications*. Clin Anat, 2004; 17(6):497-502.
- 9) Daisy Sahni A, Indar Jit B, Gupta CN, Gupta DM, Harjeet E: *Branches of the splenic artery and splenic arterial segments*. Clin Anat, 2003; 16(5):371-77.
- 10) Jauregui E: *Anatomy of the splenic artery* Rev Fac Cien Med Univ Nac Cordoba, 1999; 56(1):21-41.
- 11) Romero-Torres R: *The true splenic blood supply and its surgical applications*. Hepatogastroenterology, 1998; 45(21):885-88.
- 12) Sow ML, Dia A, Ouedraogo T: *Anatomic basis for conservative surgery of the spleen*. Surg Radiol Anat, 1991; 13(2):81-87.
- 13) Poulin EC, Thibault C, DesCoteaux JG, Cote G: *Partial laparoscopic splenectomy for trauma: technique and case report*. Surg Laparosc Endosc, 1995; 5(4):306-10.
- 14) Christo MC, DiDio LJ: *Anatomical and surgical aspects of splenic segmentectomies*. Anat Anz, 1997; 179(5):461-74.
- 15) Dawson DL, Molina ME, Scott-Conner CE: *Venous segmentation of the human spleen. A corrosion cast study*. Am Surg, 1986; 52(5):253-56.
- 16) Kehila M, Abderrahim T: *Partial splenectomy requiring ligation of splenic vessels. Apropos of 40 cases*. Ann Chir. 1993; 47(5):433-35.
- 17) Keramidas D, Buyukunal C, Senyuz O, Dolatzas T: *Splenic artery ligation: A ten-year experience in the treatment selected cases of splenic injuries in children*. Jpn J Surg, 1991; 21(2):172-77.
- 18) Alimoglu O, Sahin M, Akdag M: *Torsion of a wandering spleen presenting with acute abdomen: A case report*. Acta Chir Belg, 2004; 104(2):221-23.
- 19) Sodhi KS, Saggat K, Sood BP, Sandhu P: *Torsion of a wandering spleen: Acute abdominal presentation*. J Emerg Med, 2003; 25(2):133-77.
- 20) Romero JR, Barksdale EM Jr: *Wandering spleen: A rare cause of abdominal pain*. Pediatr Emerg Care, 2003; 19(6):412-14.
- 21) Jaroch MT, Broughan TA, Hermann RE: *The natural history of splenic infarction*. Surgery, 1986; 100(4):743-50.
- 22) Nores M, Phillips EH, Morgenstern L, Hiatt JR: *The clinical spectrum of splenic infarction*. Am Surg, 1998; 64(2):182-88.
- 23) Leemans R, Harms G, Rijkers GT, Timens W: *Spleen auto-transplantation provides restoration of functional splenic lymphoid compartments and improves the humoral immune response to pneumococcal polysaccharide vaccine*. Clin Exp Immunol, 1999; 117(3):596-604.
- 24) Bisharat N, Omari H, Lavi I, Raz R: *Risk of infection and death among post-splenectomy patients*. J Infect, 2001; 43(3):182-86.
- 25) Shimizu S, Tanaka M, Konomi H, Tamura T, Mizumoto K, Yamaguchi K: *Spleen-preserving laparoscopic distal pancreatectomy after division of the splenic vessels*. J Laparoendosc Adv Surg Tech A, 2004; 14(3):173-77.
- 26) Yu J, Turner MA, Cho SR, Fulcher AS, DeMaria EJ, Kellum JM, Sugerman HJ: *Normal anatomy and complications after gastric bypass surgery: helical CT findings*. Radiology, 2004; 231(3):753-60.
- 27) Miller LA, Mirvis SE, Shanmuganathan K, Ohson AS: *CT diagnosis of splenic infarction in blunt trauma: imaging features, clinical significance and complications*. Clin Radiol, 2004; 59(4):342-48.
- 28) Haan J, Bochicchio G, Kramer M, Scalea T: *Air following splenic embolization: Infection or incidental finding?* Am Surg, 2003; 69(12):1036-39.

- 29) Bonnard P, Guiard-Schmid JB, Develoux M, Rozenbaum W, Pialoux G: *Splenic infarction during acute malaria*. Trans R Soc Trop Med Hyg, 2005; 99(1):82-86.
- 30) Seeger M, Folsch UR: *Diagnosis of acute splenic infarction by echo-signal-enhanced ultrasound*. Dtsch Med Wochenschr, 2004; 129(16):876-79.
- 31) Argiris A: *Splenic and renal infarctions complicating atrial fibrillation*. Mt Sinai J Med, 1997; 64(4-5):342-49.
- 32) Wilkinson NW, Edwards K, Adams ED: *Splenic infarction following laparoscopic Nissen fundoplication: management strategies*. JSLS, 2003; 7(4):359-65.
- 33) Cuquerella J, Ferrer L, Rivera P, Tuset JA, Medina E, Pamos S, Ariete V, Tome A, Garcia V: *Splenic infarction*. Rev Esp Enferm Dig, 1996; 88(6):447-49.
- 34) Marques RG, Petroianu A: *Overwhelming postsplenectomy infection*. Arq Gastroenterol, 2003 ; 40(1):47-54.
- 35) Ekeh AP, McCarthy MC, Woods RJ, Haley E: *Complications arising from splenic embolization after blunt splenic trauma*. Am J Surg, 2005; 189(3):335-39.
- 36) Van Dijk GW, Van Leeuwen HJ, Van Gijn J, Hoepelman IM: *Missing spleen: Indication for pneumococcal vaccination*. Ned Tijdschr Geneesk, 2003; 147(10):425-28.