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Editorial

Splenic Artery Embolization in Blunt Trauma

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Editorial

The spleen is the solid organ most frequently affected patients with traumatic abdominal injuries. Management of Splenic injuries has changed considerably during the past 30 years. Traditionally, a laparotomy and splenectomy was performed for splenic injuries. But in hemodynamic ally stable patients No Operative Management (NOM) has evolved to be the standard of care due to the possibility of spleen arterial embolization.

Nonsurgical management with bed rest and observation traditionally has been the treatment of choice for splenic injury in paediatric patients. The Eastern Association for the Surgery of Trauma Practice Management Guidelines Working Group has advocated the use of nonsurgical management as the first-line therapy also in adults. However, high failure rates (from 10% to 50%) with nonsurgical management in adults, with a resultant need for secondary splenectomy, have been reported.

Spleen Arterial Embolization (SAE) can increase the success rate of NOM by stopping ongoing bleeding and by preventing delayed rupture of the spleen, in particular when the following CT findings are present: contrast extravasation, pseudo aneurysm or arteriovenous fistula, large hemoperitoneum, and a high grade of injury (grade III–V).

In this report, we present our experience as trauma centre in NOM for splenic injury, with special regard to embolization procedure.

A brief report of our protocol is following. At the time of admission, the splenic injuries are classified according to the American Association for the Surgery of Trauma (AAST). Grades I and II are classified as low grade and grades III–V as high grade. Minimal hemoperitoneum are defined as intra-abdominal blood located only in the perisplenic recess. Significant hemoperitoneum Ares defined as intra-abdominal blood located in areas other than the perisplenic recess.

SAE is routinely performed 24 h/7 days per week by an experienced interventional radiologist team if signs of active bleeding (contrast blush or cutoff), pseudo aneurysm, or arteriovenous fistula were detected on CT scan. Splenic arterial catheterization is performed by using the common femoral artery access using a 4-Fr sheath introducer.

Diagnostic series of the Splenic artery are obtained using a 4- or 4-Fr catheter or celiac catheter. For selective catheterization of Splenic artery branches coaxial micro catheters and microguidewires are usually required.

Proximal embolization is performed in diffuse bleeding of the spleen, if there are multiple focal bleeding vessels in the spleen, when there is time-pressure as a result of the hemodynamic situation of the patient, when tortuosity of the Splenic artery prevents selective distal embolization and in patient with grade III-IV without active bleeding.

Selective distal embolization is reserved for patients who had one or only a few focal bleeding vessels in the spleen and in whom the anatomy and hemodynamic situation allow employment of this.

From 2009 to 2013, 255 patients were admitted with blunt trauma at Maggiore Hospital, Bologna, Italy. Of these, 205 (80,3%) were selected for NOM, out of which 60 (29,2%) underwent SAE. In 13 out of 60 NOM management (21,6%), SAE failed management and splenectomy was performed.

SAE was successfully performed in 5 out of the 13 patients, who after underwent splenectomy. At admission, these patients presented high grade spleen injury (IV-V grade) and significant hemoperitoneum at admission; moreover, there was low blood pressure as a consequence of other abdominal injuries.

In the other 8 cases, splenectomy was performed after failure of SAE procedure and splenic infarction occurred.

Based on our experience SAE seems to increase the success of NOM in blunt trauma.

Proximal embolization performed exclusively with coils decreases the volume of splenic arterial blood flow with relative hypotension in the splenic bed, which allows the spleen to repair itself without infarction.

Spleen artery has many branches that supply the pancreatic body and tail. The first large branch is the dorsal pancreatic artery, and the second large branch is the greater pancreatic artery (or arteria pancreatica magna), which arises from the middle segment of the Splenic artery. When embolization is planned, visualization of the pancreatic arteries is essential to reduce the risk of their unintended embolization.

Others collateral vessels, via the short gastric and gastroepiploic arteries, to the patent distal splenic and transgastric.

Embolization is usually performed with micro coils as distally as possible, in a small arterial branch that supplies the segment in which extravasation, pseudo aneurysm, or abrupt termination is depicted, to preserve perfusion to the remaining splenic parenchyma. Patients with a high risk for secondary rupture of the spleen should undergo embolization with coils also in a more proximal segment of the splenic artery to reduce the pressure in the splenic parenchyma and help the spleen to heal.

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The incidence of segmental splenic infarction and intrasplenic air is increased with distal embolization. Splenic abscess occurs in a small percentage of patients and may be successfully managed percutaneously or intraoperatively. Salvage rates are similar whether embolization is performed in an artery segment distal or proximal to the splenic artery origin.

Based on our experiences in addition to nonoperative management SAE has clearly been shown to be feasible, safe and effective in increasing rates of Splenic savage.

Embolization is particularly beneficial in injuries of AAST grade III or higher, which previously required laparotomy (and possible splenectomy) and were more likely to fail nonoperative treatment. Clinical and CT-based criteria can be used effectively to triage patients between simple observation, angioembolization and surgery.

The success is nevertheless based on good teamwork among surgeons and radiologists, as well as judicious selection of patients to undergo the procedure.

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