

POST-TRAUMATIC SPLENIC PSEUDOANEURYSM: SERIES OF 10 CASES IN 4 YEARS

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Abstract: Splenic conservative treatment is nowadays widely used in medical practice, but it is still a challenge for surgeons due to its vascular complications. Vascular complications, such as pseudoaneurysms and AVFs after non-operative treatment of massive viscera, are important causes of treatment failure. In this article we will analyze a series of 10 cases of pseudoaneurysms and post-traumatic AVFs, as a failure of non-operative treatment of splenic trauma performed at HMLJ. In this series of cases, 10 patients developed pseudoaneurysms during conservative treatment of splenic trauma. All diagnoses were made by tomography with grade III/IV lesions. Of the 10 cases, 7 patients underwent partial splenectomy, 2 underwent an endovascular approach (one patient underwent truncal embolization of the splenic artery and the other underwent selective branch embolization) and 1 patient underwent total splenectomy. No complications were observed in the therapeutic approaches. This series demonstrated satisfactory results in splenic preservation even in the presence of these complications.

Keywords: Splenic pseudoaneurysm, conservative treatment, splenic trauma, partial splenectomy, splenic embolization

INTRODUCTION

Post-traumatic splenic pseudoaneurysm represents a challenging vascular complication. It often originates from blunt or penetrating injuries, manifesting as an abnormal communication between the splenic artery and the adjacent perivascular space. In this context, the rupture of small splenic arterial branches can lead to the formation of a pseudoaneurysm, with blunt injuries being the most common in this scenario. Post-traumatic arteriovenous fistulas represent an uncommon but equally challenging complication. It is characterized by abnormal

communication between an artery and a vein leading to an uncontrolled arteriovenous shunt.

The diagnosis of these complications plays a crucial role, with advanced imaging methods, such as CT angiography, excelling in the accurate identification of these lesions.

The management of these cases can range from a conservative approach with vigilant observation, to more invasive interventions, such as selective embolization or partial or total surgical resection of the organ in more complex situations. The choice of strategy depends on several factors, including the degree of injury, the patient's hemodynamic stability and the presence of associated complications. A deep understanding of this situation is essential for an effective therapeutic approach.

The present article aims to analyze a series of 10 cases of pseudoaneurysm and post-traumatic AVFs (arterio-venous fistulas), as a complication of non-operative treatment of splenic trauma performed at HMLJ, over a period of 4 years.

MATERIAL AND METHODS

A retrospective analysis was carried out with an active search of medical records of cases of splenic trauma, which developed pseudoaneurysms and/or AVFs during conservative treatment over a 4-year period, from 2016 to 2020, at Hospital Municipal Lourenço Jorge. Only patients with blunt splenic trauma and grade III and/or IV injuries were selected. Furthermore, images of pseudoaneurysms/AVFs evidenced in contracted exams such as CT angiograms were used as inclusion criteria.

RESULTS

Ten cases of blunt splenic trauma were analyzed over a 4-year period at Hospital Municipal Lourenço Jorge. All patients

included were victims of blunt splenic abdominal trauma, with grade III and/or IV injuries and opted for conservative treatment. They underwent contrast angiotomography exams that showed splenic pseudoaneurysm and/or AVF.

Among these patients, 9 were male and 1 was female. The average age of the patients was 35 years. All patients in the study were treated surgically, 70% of them with a planned, planned surgical approach and 30% developed hemodynamic instability, opting for emergency surgery. Among the techniques used, 70% of patients underwent partial splenectomy, 10% total splenectomy, 10% opted for truncal embolization and 10% underwent selective embolization. The treatment delta T ranged from 1 to 30 days. Among the periods evaluated, 3 patients were approached from 1 to 3 days, 4 patients from 4 to 7 days, 2 patients from 8 to 15 days and 1 patient from 16 to 30 days. In the present study, some complications were observed, including 1 patient developed abdominal wall abscess, 1 patient presented splenic infarction/abdominal abscess, 1 patient presented thrombocytosis and 2 patients developed atelectasis/pneumonia. No new splenic bleeding, gastric or pancreatic fistulas were observed. The mortality rate in the present study was 0%.

DISCUSSION

Conservative treatment in splenic trauma has evolved over time with an increasing trend towards non-operative approaches in selected cases, particularly when there is hemodynamic stability and the injury is considered non-expansive. Vigilant observation, hemodynamic support and imaging monitoring become important in conservative management. In cases of patients undergoing conservative treatment who develop hemodynamic instability and/

or vascular complications, it is still possible to perform conservative operative treatment such as partial splenectomy and truncal or selective embolization.

The open technique of partial splenectomy begins with careful sectioning of the ligaments in order to avoid possible pancreatic and gastric injuries, especially fistulas. Thus, after the spleen is taken to the surgical wound, the portion to be removed can be demarcated according to the segmental vascular supply. At this point in the surgery, it is extremely important to control the organ as it will be demarcated and sectioned with a scalpel or electrocautery, partially having hemostatic control over it. Splenorrhaphy techniques with an omentum patch will be performed on the resected edge. This technique, when performed well and by a surgeon experienced in this technique, has high success rates as well as low mortality, as in the present study.

In this scenario, partial splenectomy emerges as a conservative operative strategy and it is essential to recognize the benefits of partial splenic preservation, as one of the main advantages is the preservation of the immunological and hematological functions of the spleen, such as antibody production and blood cell filtration. Furthermore, partial splenectomy prevents the occurrence of fulminant post-splenectomy infection (IFPE), a common occurrence in splenectomized patients due to contamination by encapsulated germs, especially in children. In clinical studies of patients undergoing spleen-sparing surgery, humoral immunity was only transiently depressed compared to patients undergoing total splenectomy, being associated with a lower risk of postoperative infection.

Among the non-operative treatment options for vascular complications in splenic trauma, we can forgo truncal and selective embolizations. Angiographic embolization was first applied in the treatment of

splenic lesions in 1981. This technique requires specialized imaging and vascular interventionalist (vascular surgeon, or interventional radiologist) with experience in celiac artery catheterization and embolization techniques. Indications for embolization are based on topographic evidence associated with the patient's clinical condition.

Retrospective reviews have found variable success rates (57 to 95 percent) for splenic salvage. Embolization is not without complications: hemorrhage, abscess, heart attack, renal failure, complications at the access site, such as infection, thrombosis. Estimated complication rates of up to 20% have been reported with serious complications less than 4%.

The splenic embolization technique first involves percutaneous access to the abdominal aorta through the brachial or femoral artery. The celiac axis is cannulated and arteriography celiac disease is performed to confirm computed tomography findings and evaluate the splenic vasculature. The presence of parenchymal contrast extravasation splenic artery supplied by short gastric vessels on celiac arteriography must lead to intervention surgery, as these lesions are less susceptible to embolization due to the difficulties techniques for accessing short gastric vessels.

Splenic artery embolization can be performed either proximally or distally, studies non-randomized trials did not demonstrate the superiority of one technique over the other, although Non-operative management failure rates may be higher when proximal embolization is applied to patients with higher-grade injuries. However, complication rates related to splenic embolization may be higher with distal embolization. Recent data suggest that angioembolization must not be automatically performed after diagnosis and instead the approach must be case-based, allowing consideration of non-operative management.

CONCLUSION

Splenic pseudoaneurysms are not uncommon due to nonsurgical management of splenic injuries. Review of the data found that the rates are present in approximately 7%-15% of patients on repeat imaging,

primarily in patients with splenic grade III injuries or above. In the present study we can demonstrate that splenic preservation, even in the presence of vascular complications, can indeed be an option with partial splenectomy or embolization since success rates were high.

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