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ORIGINAL ARTICLE

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Is splenic lobe/segment dearterialization feasible for inferior pole trauma during left hemicolectomy?

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Abstract We discuss splenic salvage by lobe/segment dearterialization, without resection, after intraoperative trauma, and present two cases. We performed a retrospective analysis of 163 patients in whom the colon splenic flexure was mobilized. Patients with ileo-rectal anastomosis or urgent cases were excluded. Surgical operations included left hemicolectomy and anterior resection of the rectum. Splenic procedures were splenorrhaphy, dearterialization and splenectomy. Spleen lesions occurred in 4 (2.45%) cases. One capsular tear was managed with splenorrhaphy. Three mechanical lesions to capsula and tissue of the inferior pole were managed by either splenectomy (the first case) or dearterialization. Overall mortality in the series was 4.3%. Among the patients with splenic procedures, the splenectomized patient died due to pulmonary embolism. The two cases treated by inferior splenic branch and inferior polar artery ligature are presented. In operative trauma to the inferior splenic pole, bleeding can be controlled by lobe/segment dearterialization and by methods of local hemostasis in most cases.

Key words Spleen salvage • Operative trauma-hemicolectomy • Cancer

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Introduction

Today, preservation of an otherwise healthy spleen is considered favorable [1, 2]. From the anatomical standpoint splenic segmentation is an established entity [3-5]. The spleen is usually composed of two lobes, and 2-6 segments. In some cases a separate superior or inferior polar segment exists [3, 5]. Anastomosis between these lobes and segments has been demonstrated in anatomical studies [5]. Dearterialization of the inferior lobe of the spleen has been performed in the treatment of thalassemia major [6]. Interestingly, necrosis of the dearterialized parenchyma did not occur in these children.

The aim of this report is to demonstrate the feasibility of splenic preservation by lobe/segment dearterialization (without resection of splenic tissue) after intraoperative trauma to its inferior pole during left hemicolectomy. We present two cases in which this procedure was successfully performed. These lesions appear to occur with an incidence of 2% [7], even though we feel that it is under-reported.

Materials and methods

We performed a retrospective analysis of 163 patients who underwent elective surgery for mobilization of the splenic flexure of the colon (left hemicolectomy and anterior resection of the rectum), in the time period from 1 January 1991 to 30 December 1998 in the Surgical Clinic KBC Dr Dragisa Misovic. The procedures were performed by two surgeons. Patients in which an ileorectal anastomosis was performed or who were operated on as urgent cases were excluded from the series.

The data analyzed included: gender, age, indications for surgery, surgical procedure performed, required blood transfusions (intra- and postoperative), spleen lesion, nature of spleen lesion, and postoperative morbidity and mortality related to splenic salvage procedures.

All surgical resections were performed in consideration of oncologic criteria, en block resections with ligature of the inferior mesenteric pedicle and with the mobilization of the splenic flexure of the colon in order to perform a tension-free anastomosis.

In cases of lesion of the spleen, splenic salvage was performed by splenorrhaphy where possible. Dearterialization without splenic resection was performed for larger lesions of the inferior pole when the operating surgeon considered splenorrhaphy insufficient. Splenectomy was left for the last resort.

Postoperative monitoring of the patients was routine, and in those where splenic salvage was performed laboratory tests and ultrasonography were performed on a daily basis. The data were analyzed with a statistical software package (Statistica 5.0 for Windows, StatSoft, Tulsa, USA).

Results

The age of the patients was between 43 and 85 years (mean, 65.8±8.4). The M:F ratio was 7:5. There were 11 patients older than 80 years (6.7%). Of the 163 patients analyzed, 157 (96.3%) were operated on for cure of cancer, while the remaining 6 (3.7%) had diverticulosis. The operative procedures performed consisted of 108 (66.3%) left hemicolectomies and 55 (33.7%) anterior resections of the rectum. Mean intraoperative blood transfusion was 454±120 ml, and mean postoperative blood transfusion needs were 330±72 ml.

Spleen lesions were noted in 4 cases (2.45%). One case was a capsular tear on the superior surface of the spleen managed with splenorrhaphy, and the remaining three cases consisted of mechanical lesions to the capsula and tissue at the inferior splenic pole. The first of these lesions was early in the series, and a splenectomy was performed, while dearterialization was performed in the latter two.

The mortality of the total series was 4.3% (N = 7). There was one death among the 4 patients who had undergone procedures on the spleen. The patient in whom splenectomy was performed died on the fifth postoperative day due to pulmonary embolism. The two patients who underwent dearterialization on the spleen had successful recoveries; their cases are described in the following paragraphs.

Case 1

A 74-year-old-woman admitted for rectal bleeding was preoperatively diagnosed with cancer of the proximal third of the rectum and operated on when an anterior resection of the rectum was performed for an operable lesion. During the mobilization of the splenic flexure of the colon, a laceration of the inferior splenic pole occurred, with consecutive hemorrhage. This complication resulted in a decrease of blood pressure to 90/60 mmHg and a pulse of 120 min^{-1}. After packing the inferior splenic pole, the splenic artery was identified superior to the pancreas and a vascular clamp was placed on it. Careful preparation of the splenic hilum revealed an inferior polar artery that originated from the trunk of the splenic artery (Fig. 1). This artery was divided, and the vascular clamp removed. Oozing from the laceration was controlled with electrocautery. When the surgical procedure was completed, hemostasis was checked and proved to be sufficient. The patient had an uneventful postoperative course without signs of liquid collection on daily ultrasonograms. She left the hospital on the ninth postoperative day. Intraoperative blood transfusion requirements were 660 ml, and the patient received another 450 ml blood postoperatively.

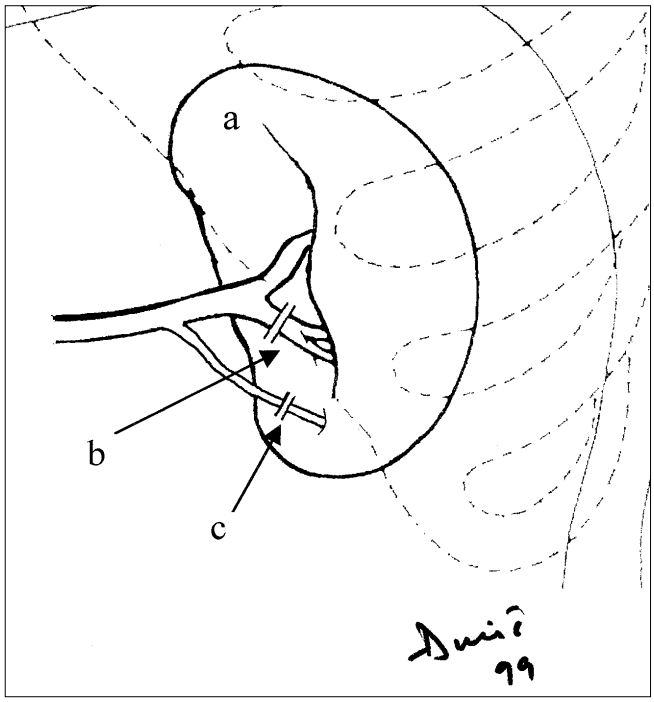

Fig. 1 Splenic lobe/segment dearterialization. *a,* The spleen. *b,* The inferior terminal branch of the splenic artery. *c,* The inferior polar artery

Case 2

A 47-year-old man admitted for transient large bowel obstruction was preoperatively diagnosed with carcinoma of the descending colon and underwent a radical left hemicolectomy due to an operable lesion. While applying traction to the colon, a capsular and tissue tear on the inferior pole of the spleen occurred with consequent bleeding. This bleeding resulted in the destabilization of the patient. After packing the spleen and placement of a vascular clamp on the splenic artery in its suprapancreatic segment, his blood pressure and pulse normalized. The splenic hilum was carefully prepared and, since no polar artery was identified, the inferior terminal branch of the splenic artery was divided. Following removal of the vascular clamp, oozing was controlled with the use of electrocautery. The operative procedure was completed and hemostasis proved to be sufficient. This patient

had a transient fever during the postoperative course from the fourth to the ninth days, without evidence of abscess formation on ultrasound examination. Apart from this he had an uneventful postoperative course and left the hospital on the twelfth postoperative day. Intraoperative blood transfusion requirements were 1110 ml, and the patient received another 660 ml blood postoperatively.

Discussion

The fact that splenectomy is a short and relatively safe procedure has influenced many surgeons to prefer it in cases of intraoperative splenic trauma. The methods at hand such as splenorrhaphy and splenic resection carry a significant risk and are often difficult to perform [8, 9]. Nevertheless, today, splenic salvage is considered beneficial for the immunological status of the patient [10].

Anastomoses between the arteries of the splenic hilum have been clearly demonstrated as intraparenchymal and extraparenchymal, occurring in 33% cases [5]. Even though the calibers of intrasplenic anastomoses are small and of negligible surgical importance, their role is immense during the postoperative period, because they are the source of splenic lobe or segment revascularization [5]. We consider this to be the reason for the uneventful postoperative courses in our two patients, as for the children that have undergone inferior lobe dearterialization of the spleen for thalassemia major [6]. The evident increase of required blood transfusion in these patients is attributed to the bleeding itself, as to the fact that we have performed only two such procedures.

We conclude that, when operative trauma of the inferior splenic pole occurs during left hemicolectomy, it is possible to control the bleeding by ligation of the inferior polar artery (if present) and by methods of local hemostasis. If this artery is not present, ligation of the inferior terminal branch of the splenic artery is recommended. The idea is to deprive a splenic lobe/segment of its arterial supply, and complications are not expected due to the fact that this lobe/segment comprises a small amount of tissue and that revascularization is possible through intraparenchymal anastomoses.

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