Indications and Techniques for Fibrin Sealing in Spleen Surgery

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Abstract

Surgical treatment of splenic lesions aims to save the organ in order to preserve hematological and immunological functions. The choice of surgical procedure will depend on the type and degree of injury in trauma cases and on the respective disease in elective cases. Any number of surgical treatment options for the various situations are available. During a period of 56 months, we administered organ-conserving treatment to 69 adults for a variety of indications. Four trauma patients were managed nonoperatively and 65 underwent surgery. Coagulation was used in three trauma cases with first- and second-degree ruptures. For the remaining patients, fibrin sealing was the main treatment or an adjuvant along with other surgical procedures. Fibrin sealing alone was used in 19 cases. In 28 cases, we used mesh splenorrhaphy for severe bursting ruptures and stapler resection was used in 15 further cases. Primary hemostasis was achieved in all the trauma patients. There was only one case in which a second operation was required for postoperative bleeding and there was one further case that required a secondary splenectomy. Blood transfusions were never required in elective cases, and none of them required further surgery. Postoperative laboratory work and scintigraphy showed optimal splenic perfusion and preservation of hematological and immunological function in all patients. Thus, we can say that spleen preservation using fibrin glue as monotherapy or adjuvant to other techniques can be safely performed in adult patients, either after a variety of injuries or in elective cases. The risk of postoperative bleeding is 1.5%, which is less than for splenectomy. For safe performance of spleen-preserving surgery, the spleen must be fully mobilized and visualized during surgery.

Introduction

The spleen is one of the few organs whose morphology and function long remained unstudied and whose real importance went unrecognized. In antiquity, the spleen was thought to belong to the digestive tract; this view persisted into the seventeenth century. It was not until 1686 that Malpighi demonstrated the follicular and trabecular structure of the spleen and the fact
that it had its own arterial and venous circulation (cited in [12]). In 1919, Morris and Bullock first showed the influence of the spleen in resistance to infection and found an increased mortality in splenectomized rats inoculated with the rat plague bacillus [9]. O'Donnel reported the first human case of fatal postsplenectomy sepsis in 1929 [11]. In 1952, King and Shumacker concluded that removal of the spleen for spherocytosis in five infants aged less than 1 year led to severe infections [6].

The first splenectomy was performed in Palermo in 1549 by Zaccarello of Palo (cited in [8]). However, due to the unsatisfactory course of splenectomies before the turn of the present century, mortality with clinically recognized splenic injuries was nearly 100%. With the introduction of asepsis in surgery and standardization of the surgical technique in the 1930s, mortality decreased to 27%. Thus, splenectomy became the gold standard treatment for splenic injury [1]. The real revolution in surgical handling was introduced by the pioneering work of Leon Morgenstern and the Brazilian surgeon Marcel Campos Christo in the early 1960s and 1970s. Christo first reported experimental segmental splenectomy in animals. Then he applied these techniques to eight patients with splenic injuries [2]. In 1966, Morgenstern reported subtotal splenectomy in myelofibrosis [7]. These publications on partial splenic conservation in trauma and massive splenomegaly attracted the attention not only of pediatric, but also of general surgeons. Morgenstern's work especially has had a significant impact on acceptance of splenic preservation. Since the mid-1970s, the routine splenectomy procedure has gradually changed, and today conservation of the organ can be seen as an established method. Treatment options now range from nonoperative treatment to splenorrhaphy and hemisplenectomy [16].

Tissue sealing presents a valuable alternative. Of the adhesives currently available, the most suitable for treating splenic lesions is fibrin glue. A major advantage of the adhesive procedure is that it can be combined with all other techniques as an additional hemostatic measure.

**Patients and Methods**

Between May 1, 1987 and December 31, 1991, 69 adults underwent organ-conserving splenic surgery (Table 1). Fibrin adhesives were used either alone or with other measures in all patients with the exception of seven traumas, including four nonoperatively managed cases and three treated with coagulation. Among the 62 patients treated with fibrin glue, 19 had first- and second-degree splenic injuries (seven traumatic and 12 accidental ruptures); here, the sealing technique was used alone. It was used supplementally in the remaining 28 mesh splenorrhaphy and 15 stapler resection patients. Fibrin glue was thus applied in 62 cases or 90% of the 69 spleen-preserving operations.