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☐ Original Article ☐

Laparoscopic Splenectomy for Immune Thrombocytopenic Purpura -Long Term Result of 40 Laparoscopic Splenectomies-

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Abstract

Laparoscopic surgery has recently extended its indications and it has also become an acceptable surgical approach for splenectomy. In the last five years, we have performed 40 laparoscopic splenectomies for immune thrombocytopenic purpura. Thirty-five patients were female and 5 patients were male. The mean age was 34, varying from 17 to 56. After learning to perform laparoscopic splenectomy with five ports, we are now usually using three or four ports in a right lateral kidney position. There was no case of conversion to exploratory laparotomy. The mean hospital stay was 7 days. There was no perioperative mortality; but in 2 cases we had postoperative subphrenic abscesses which were successfully managed by catheter drainage. Since undergoing laparoscopic splenectomy, 28 patients (70%) were weaned effectively from their steroid medications. Eight patients (20%) have been on small doses of steroid, and 4 patients (10%) have been on the same doses of steroid with no response. The patient group with rapidly increasing platelet count after splenectomy showed a statistically significant relation with the complete response group ($p < 0.001$). Laparoscopic splenectomy is a safe and reasonable operative procedure for patients with immune thrombocytopenic purpura.

Key Words: Laparoscopic surgery, splenectomy, immune thrombocytopenic purpura, hematologic disease

INTRODUCTION

Laparoscopic surgery has been accepted as a reasonable procedure by decreasing the morbidity of surgery and the cost of hospitalization. Widespread application of laparoscopic approach to cholecystectomy has stimulated the extension of indications in laparoscopic surgery. Since Delaitre et al. attempted the first laparoscopic splenectomy in 1991, laparoscopic splenectomy has become more popular.[1] The most common nontraumatic cause of splenectomy is immune thrombocytopenic purpura. Immune thrombocytopenic purpura (ITP) is an autoimmune disorder characterized by platelet destruction caused by an antiplatelet autoantibody that results in platelet phagocytosis by the reticuloendothelial system. The spleen is the source of this antibody and also the major site for sequestering sensitized platelets. Splenectomy results in a much higher cure rate than any medical regimen and should be recommended early in the course of disease if steroids do not result in a permanent, unmaintained response.

For the first 150 years, the standard surgical approach to splenectomy has been by laparotomy, either through a vertical or subcostal incision. The spleen, with its known complex vasculature and peritoneal attachments, at first glance seemed to defy the feasibility of splenectomy which offers the advantage of minimally invasive surgery, but the safety and feasibility of the procedure have yet to be proved. We have reported earlier the results of laparoscopic splenectomy for immune thrombocytopenic purpura in 15 patients.[2] Meanwhile, we have accumulated further experience in laparoscopic splenectomy.

MATERIALS AND METHODS

From October 1994 to October 1999 in the Department of Surgery, Yonsei University Medical

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Center, Seoul, Korea, we have performed a total of 53 laparoscopic splenectomies. Among them, 40 patients had immune thrombocytopenic purpura, which was diagnosed by the internist; and they were referred to us after non-effective steroidal therapy or because of the intolerable side effects of medications. Of the 40 patients, 38 were receiving steroids at the time of operation, and 20 required preoperative immunoglobulin G (IgG) infusion or additional platelet transfusion. Two patients were treated with cyclosporin and immuran.

Clinical follow-up was current as of October 1999, and follow-up information was obtained for all 40 patients. Mean follow-up time was 29 months. We categorized the following response criteria: 1) complete response, therapy resulting in a normal platelet count without steroid; 2) partial response, therapy resulting in a tolerable or normal platelet count of $\geq 50,000/\mu l$ with smaller dose of steroid than preoperative; and 3) no response, therapy resulting in no response or an increase to $< 50,000/\mu l$.[3] To compare the relation between long-term results and early response of surgical treatment, we divided the patients into two groups according to the increase of platelet normalization after splenectomy: 1) rapid increasing group, to which belonged the patients whose platelet counts on the 7th postoperative day increased more than two times preoperative platelet counts; 2) non-rapid increasing group, to which belonged patients whose platelet counts did not increase as much as the rapid response group. The relation between both groups and surgical long-term effect was tested by Fisher's Exact test.

Technique of operation

The preoperative workup included full hematologic testing and splenic scan. There is no indication for preoperative platelet transfusion when the platelet count is $> 50,000/\mu l$. No pneumococcal vaccination or chemoprophylaxis with subcutaneous heparin was done for any patient.

After receiving general anesthesia with endotracheal intubation, the patient was placed in the modified lateral kidney position, except for eight consecutive early cases that we adopted supine position. We used five ports (three 10/12-mm ports and two 5-mm ports) for the first eight cases, but we could save one 10/12-mm port after changing the patient's position from supine to right lateral kidney position.[4] With the development of technical skill we have recently used only three ports (one 10/12-mm port and two 5-mm ports) in selected cases (Fig. 1). The resected spleen was maneuvered into a plastic endo-pouch introduced in the abdomen,[5] and it was morcellized and removed in pieces though the trocar site. The detailed procedure was done as described earlier.[2]

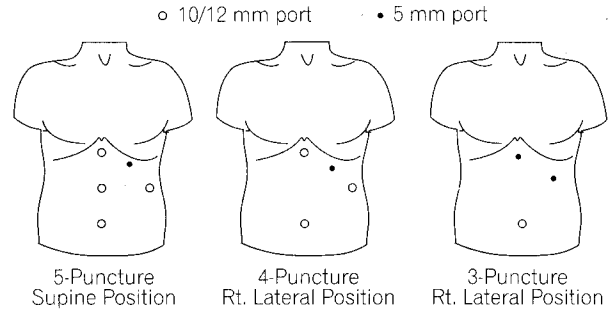

Fig. 1. Trocar placement for laparoscopic splenectomy.

RESULTS

Patients characteristics

Laparoscopic splenectomy was successful in all 40 cases. Among them, 35 were women, 5 were men, and most were in the third and fourth decades of life. The youngest was 17 years of age, and the oldest was 56 years old (mean age: 33.9 years).

The mean operative time for laparoscopic splenectomy from the initial incision was 128 ± 48 min; but it took 105 ± 24 min (detaching operative time average) from just after insertion of the trocar to detachment of the spleen. The operative time gradually decreased; the shortest operation time was 60 min.

Although we could not detect the accessory spleen by splenic scan, we found an accessory spleen in three patients. The location of the accessory spleen in the first patient was near the hilum, measuring 1.0 cm diameter, the others were on the greater omentum and measured 0.5 and 1.0 cm in diameter respectively.

Bleeding during operation was rare, and there was an average blood loss of 153 ml (40-600 ml) in four cases. Two patients received transfusions. The average

weight of spleen after piecemeal removal of splenic tissue was 165 g. Three (7.5%) complications occurred, but no mortality. Two patients had a subphrenic abscess that had been treated by percutaneous drainage, and one patient had a transient pulmonary edema and pleural effusion. Oral intake was normally begun within 1 days. The average postoperative stay was 7 days. Postoperative oral steroids were tapered soon thereafter.

Outcome of splenectomy

After stopping the oral steroids, we checked the platelet count at 1,2,4 and 8 weeks; thereafter, we followed the patients at 3-month intervals for 1 year. If the platelet count was over 100,000/μl at 4 weeks or 8 weeks without steroid, we considered the patient as showing a complete response. Twenty-eight (70%) of the 40 patients subjected to laparoscopic splenectomy responded completely and to date have required no further steroid therapy (Table 1). Some patients had to take further steroid after splenectomy, but the dose of steroid was alleviated. Eight patients (20%) belonged to this partial response group which have remained on small doses of steroid. In 4 cases (10%), patients have been on the same dose of steroid, which were grouped as a non-response. A patient in the non-response group should have had combination therapy with steroid and immuran, whose platelet count stayed about 16,000/μl until 16 months after splenectomy.

Table 1. The Effect of Laparoscopic Surgery

Result	Patient No.	Percentage (%)
Complete response	28	70
Partial response	8	20
No response	4	10

Table 2. The Effect of Laparoscopic Splenectomy and Short-term Response of Platelet Count

	Rapid increasing	Non-rapid increasing
Complete response	23	5
Partial response	4	4
No response	0	4

p=0.00148 with Fisher's Exact test (2-Tail).

The effect of splenectomy could be ascertained by rapid normalization of platelet count. Already one week after splenectomy the platelet count increased in 27cases (67.5%) more than two times compared to the preoperative platelet count. The patients with rapid increasing platelet count after splenectomy showed a statistically significant relation with complete response group ($p<0.01$) (Table 2). Platelet counts of all 4 patients in the non-response group did not increase as rapidly as that of most patients with complete response. In other words, we can predict that a patient whose platelet count after splenectomy was not more than double the preoperative platelet count, was rather likely be non-responsive to the splenectomy.

DISCUSSION

Immune thrombocytopenic purpura is an acquired disorder caused by the destruction of platelets exposed to circulating IgG antiplatelet factors. The spleen is the source of these factors and it is also the major site for sequestering sensitized platelets. Female patients outnumber males at a ratio of 3 : 1. Acute ITP has an excellent prognosis in children under the age of 16 years and approximately 80% of these patients will make a complete and permanent recovery without specific therapy.[3]

At present, the generally accepted protocol for managing patients with diagnosed ITP includes an initial 6-week to 2-month period of steroid therapy. Infusion of high doses of i.v. γ-globulin and plasmapheresis have been used with limited permanent success. If the patient does not respond with an elevated platelet count, splenectomy is performed. If the patient does respond, the steroid therapy is tapered off; If thrombocytopenia recurs, splenectomy is carried out.

In 1916 Kanznelson suggested that splenectomy could induce an increase in circulating platelet and reported good results following splenectomy performed by Schloffer.[6] In most series, the results achieved by splenectomy are significantly more impressive than are the responses to steroids. Between 75 and 85% of the total number of patients subjected to splenectomy respond permanently and require no further steroid therapy.[6] In our data, we have had

70% complete response, but we could see the beneficial effect in a total of 36 patients (90%), if we take into account the patients with partial response. We observed that the long-term effect of splenectomy could be anticipated by the tendency of a rapidly increasing platelet count after surgery. If the platelet count increases two times by one week after surgery, it could be a good index for predicting that the patient will usually respond well to surgery.

Laparoscopic splenectomy was performed successfully in laboratory animals in 1990. At the 1992 World Congress of Endoscopic Surgery, surgeons from France, Belgium, Canada and the United States reported on their independent developments and successful performance of laparoscopic splenectomy in humans.[7-9] In these series, laparoscopic splenectomy proved to be a safe and feasible alternative to open splenectomy. The reduction of postoperative discomfort, rapid return of bowel function, and short period of hospitalization became strikingly contrasted factors compared to 'open' splenectomy patients.[10,11] As experience with the operative technique was gained, the operative time was also reduced. And for two reasons, the ideal patients for elective laparoscopic splenectomy are those suffering from ITP: first, the splenic enlargement in these patients is only moderate; and second, the risk of postsplenectomy sepsis is minimal.[12] In obese or high-risk patients as well as patients with massive splenomegaly, the difficulty of manipulation and the risk of intraoperative bleeding can be prevented by shrinkage of the spleen through preoperative embolization of splenic artery.[13,14]

One of the shortcomings of laparoscopic splenectomy in immune thrombocytopenic purpura is that laparoscopic surgery does not allow complete detection of accessory spleens.[15,16] We found accessory spleens in three cases, which were not detected in preoperative evaluation. Residual splenic tissue or overlooked accessory spleen can be the reason of recurrence of thrombocytopenia and resistant steroidal therapy. Our three cases belonged to the complete response group, so we think the accessory spleen was completely resected.

The patient's position and port site are important for laparoscopic splenectomy. For the first eight patients, we put the patient in a supine hyperextended position. The main advantage of this position is the greater ease of port placement and external surgical manipulation; but we needed more ports for liver and stomach retraction. We therefore changed the position from supine to right lateral kidney position, which is similar to the split lateral decubtus position used for nephrectomy, except that the tilt is short of full lateral. It provides excellent exposure of the spleen because the stomach and omentum fall away from the spleen, which remains suspended by its partial and diaphragmatic attachment. For this reason, French surgeons refer to it as "the hanging spleen technique".[17] Its disadvantage is that the external manipulations of the surgeons are more restricted than when the hyperextended supine position is used. For this reason, accurate port placement is crucial.

In this series, laparoscopic splenectomy proved to be a feasible alternative to open splenectomy. We experienced two patients with subphrenic abscesses that were treated by percutaneous drainage. These two complications occurred among 10 patients in whom drains were inserted, even though it was a closed drain. On the other hand, there were no complications in patients without drainage.

In conclusion, laparoscopic splenectomy is feasible in most patients with immune thrombocytopenic purpura and deserves to become a standard operation of splenectomy.

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