

## Original Research Article

# New technique for laparoscopic partial splenectomy to decrease blood loss

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### ABSTRACT

**Background:** Laparoscopic splenectomy is feasible, effective, and safe with low morbidity rates, faster recovery when compared with patients who undergo open splenectomy. The aim of this study was to describe a new technique for laparoscopic partial splenectomy to decrease blood loss.

**Methods:** This study started from May 2015 till April 2017. This retrospective study included total 20 adults containing 12 females, ten with hydatid cyst of the spleen with positive serological tests for *Echinococcus granulosus* (Indirect hemagglutination (IHA)) was used, and two cases with congenital splenic cysts with negative serology for *Echinococcus granulosus* and eight males with hydatid cyst positive serological tests for *Echinococcus granulosus*.

**Results:** The mean time for laparoscopic resection was 150 minutes (range from 90 to 200 min). No bleeding, no postoperative pancreatic fistula or diaphragmatic injury. No conversion was necessary. The mean hospital stay was 4 days (range from 2 to 6 days). None of the patients needed postoperative blood transfusion. No post-splenectomy infections. Three weeks and after 6 months postoperatively, US Doppler was done and found normal vascularisation of the splenic remnant.

**Conclusions:** Clipless, Sutureless laparoscopic partial splenectomy is feasible and safe. This surgical procedure offers advantages of decrease blood loss and preservation of splenic tissue, reducing the risk of post-splenectomy sepsis.

**Keywords:** Congenital cyst, Hydatid cyst, Partial splenectomy

## INTRODUCTION

Laparoscopic splenectomy was first performed in 1992 and has since gained popularity, particularly for hematological disorders of the spleen in adult and pediatric patients.<sup>1</sup>

Laparoscopic splenectomy is feasible, effective, and safe with low morbidity rates and has rapidly become the surgical approach of choice for patients that require elective splenectomy in the treatment of hematologic disorders.<sup>2,3</sup>

That is primarily because patients undergoing laparoscopic splenectomy have less postoperative pain, a shorter length of hospital stay, and faster recovery when compared with patients who undergo open splenectomy.<sup>4</sup>

Laparoscopic splenectomy was associated with significantly fewer pulmonary, wound, and infectious complications.<sup>5</sup>

Methods like 3D virtual rendering in children before laparoscopic partial splenectomy was used to give high

anatomical resolution and useful guidance in surgical procedure.<sup>6</sup>

The aim of this study was to describe a new technique for laparoscopic partial splenectomy to decrease blood loss.

## METHODS

This study started from May 2015 to April 2017. This retrospective study included total 20 adults containing 12 females, ten with hydatid cyst of the spleen with positive serological tests for *Echinococcus granulosus* (Indirect hemagglutination (IHA)) was used, and two cases with congenital splenic cysts with negative serology for *Echinococcus granulosus* and eight males with hydatid cyst positive serological tests for *Echinococcus granulosus*. Abdominal ultra-sonography and CT scan was done for all cases.

### Surgical technique

The surgical procedure was performed with an anterior approach. The operation is performed using 4 ports, the first port is inserted at the umbilicus using the open technique and is used for the laparoscope (10mm). The other 3 operating ports are positioned as follows: the first operating port is inserted in the mid line, 8 cm above the umbilicus (5mm) under the xiphoid process, a second operating port is inserted in the left anterior axillary line subcostally (5mm), the last port is positioned at the level of the umbilicus 10cm laterally (10mm) (Figure 1).



**Figure 1: Port sites.**

The patient was positioned in reverse trendelenberg with right side tilting and the surgeon was placed between the legs, one assistant on the right side of the patient and the other assistant on the left side of the patient. Author started by searching for accessory spleens, the phrenicocolic ligament, the splenocolic ligament are cauterized, then author opened the gastrocolic ligament to access the lesser sac and, cauterization and division of some gastro colic vessels by LigaSure™ Maryland Jaw,

then author pulled the stomach upward to expose the splenic pedicle. The splenic artery is exposed, branches of the splenic artery to the upper pole are conserved while other branches were examined with pulldog clamp (to detect the segment of the spleen with greyish discoloration which will be removed after creation a clear line of demarcation), then these branches were cauterized and divided by LigaSure™ Maryland Jaw (Covidien). Then, the splenic vein is identified; branches to the upper pole are conserved and other branches are divided by ligature. The short gastric vessels are then identified and cauterized and divided by LigaSure™ Maryland Jaw (Covidien). Transection of the spleen is performed using ultracision Harmonic Scalpel (Harmonic; Ethicon Endosurgery, Cincinnati, OH, USA) 0.5cm inside the greyish discoloration to decrease blood loss, so author preserved the upper pole in all cases (Figure 2).



**Figure 2: Preserved upper pole after partial splenectomy.**

The lower part of the spleen now is totally free and can be introduced into the extraction bag. The splenic tissue is exteriorized through a Pfannenstiel incision, then the specimen sent to pathology, then peritoneal washing and splenopexy is performed by suturing the upper splenic remnant to the abdominal wall next to diaphragm. No drains were used.

## RESULTS

This retrospective study included total 20 adults containing 12 females, ten with hydatid cyst of the spleen with positive serological tests for *Echinococcus granulosus* [Indirect hemagglutination (IHA)] was used, and two cases with congenital splenic cysts with negative serology for *Echinococcus granulosus* and eight males with hydatid cyst positive serological tests for *Echinococcus granulosus*. Abdominal ultra-sonography and CT scan was done for all cases.

Author preserved the upper part of spleen in all cases. No bleeding, no postoperative pancreatic fistula or diaphragmatic injury. No conversion was necessary. The

mean hospital stay was 4 days (range from 2 to 6 days). None of the patients needed postoperative blood transfusion. No post-splenectomy infections. Three

weeks and after 6 months postoperatively, US Doppler was done and found normal vascularization of the splenic remnant (Table 1).

**Table 1: Patients data.**

Gender	12 (Females)	8 (Males)
Mean age	22 years (range:20-25)	19 years (range:17-24)
Ultrasonography and CT	The mean cyst diameter was $8\pm 2.3$ cm (range:5-9cm) with splenomegaly	The mean cyst diameter was $6.5\pm 4.6$ cm (range:5.5-8cm) with splenomegaly
Mean operative Time	$120\pm 22.3$ min (range:90-170 min)	$150\pm 17.9$ min (range:140-200 min)
Post-operative complications	None	None
Histopathologic examination	A cyst with epithelial lining and inflammatory cells (in 2 cases with congenital cysts). A cyst with scattered brood capsules the cyst wall having an outer acellular laminated layer and inner germinal layer (10cases with hydatid cysts).	A cyst with scattered brood capsules, the cyst wall having an outer acellular laminated layer and inner germinal layer (8 cases with hydatid cysts).

## DISCUSSION

Laparoscopic partial splenectomy has gradually been applied in the treatment of cystic or solid tumors.<sup>7,8</sup> Several surgical methods have been applied to splenic hydatid cysts ranging from total splenectomy to more conservative procedures (partial splenectomy, cystic enucleation, or omentoplasty after partial resection of the cyst wall).<sup>9</sup> In this cases author performed partial splenectomy to all the cases. Laparoscopic partial splenectomy was first described in 2003.<sup>10</sup> The experience is larger nowadays.<sup>11</sup> In the technique, author conserved the upper part. Indeed, partial splenectomy is so important to prevent post splenectomy infections to preserve the immune role of the spleen.<sup>12-15</sup>

In the present study, no post-splenectomy infections occurred, compared to other studies with life-threatening complications after total splenectomy.<sup>16</sup> Compared to others with to total splenectomy there is no secondary atherosclerotic, no pulmonary hypertension, no thrombotic events.<sup>1,16</sup> Regrowth of the splenic remnant didn't occur in present study compared to others.<sup>14,15</sup> In the present study, the mean hospital stay was only 4 days. In the technique, bleeding risk is limited by use of LigaSure™ Maryland Jaw Covidien. Harmonic Scalpel was used for transection 0.5cm inside the greyish discoloration to decrease blood loss. Ultracision harmonic scalpel allows to complete a clean and non-hemorrhagic transection of the spleen and makes the laparoscopy safer and with minimal blood loss, as described for decapsulation of splenic cysts in children.<sup>17</sup>

## CONCLUSION

Clipless, Sutureless laparoscopic partial splenectomy is feasible and safe. This surgical procedure offers advantages of decrease blood loss and preservation of

splenic tissue, reducing the risk of post-splenectomy sepsis.

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