Laparoscopic splenectomy – by Michael Rhodes

Introduction

Laparoscopic splenectomy was first reported at the end of 1991[1] [2]. Within just four years series were being reported from centres where the technique had become the method of choice for splenectomy[3]. There are now quite a number of large series from around the world which confirm the laparoscopic approach to splenectomy is the treatment of choice for the majority of patients [4], [5], [6], [7]. Results from around the world are similar, with operative duration between 60 and 90 minutes, hospital stay between 1 and 2 days and morbidity less than 10%. There are still areas of controversy when treating patients with splenomegaly and also questions about the best role for hand assisted surgery.

Surgical technique

Laparoscopic splenectomy may be performed in either the left lateral position (so called hanging spleen) or supine. The majority of surgeons worldwide use the supine position and this will be described in detail here. There is no doubt that in addition to the bare bones of the surgical technique, laparoscopic surgery on the spleen is made much easier by having a theatre team familiar with laparoscopic procedures and a surgeon who is experience in other laparoscopic techniques[8].

The patient is placed supine, with a sand bag or 1 litre bag of saline under the left loin (to push the spleen forwards). 20 degrees of head up tilt help access. Intital laparoscopy is undertaken from the umbilicus using the Hasson technique and 3 or 4 further ports are used. Two in a horizontal line between the umbilicus and the left costal margin (the most lateral as a 12mm port to accept staplers). One or two are placed vertically above the umbilicus, both are 5mm.

The camera holder also retracts the greater omentum from the lower pole to allow dissection of the lower pole vessels using harmonic shears (although both simple diathermy or ligasure devices may be used here also). Once a clear view in front and behind the hilum is obtained, the simplest was forward is to place a vascular stapler across the main hilum and divide splenic artery and vein this way. Care must be taken to remain close to the spleen as straying medially may damage the tail of the pancreas. A simple approach to the short gastric vessels is to include them in the vascular staple line or reload the stapler to divide them. The purist may argue this could be done using the harmonic shears or clips, but the vascular stapler is by far the quickest and most efficient tool for the job. It also has the advantage of avoiding any damage to the gastric wall when the short gastric vessels are very short. One important point is NEVER combine clips with the vascular stapler as inadvertent firing of the stapler across a previously placed clip will lead to the stapler jamming – a disaster.

Once all the vessels are divided up to the angle of His, the spleen may be lifted anteriorly to allow division of the peritoneal attachments using harmonic shears or scissors. In cases of massive splenomegaly this manouveure may prove all but impossible as there is no room to lift the spleen. Once the spleen is lifted free of attachments it is best removed using the Tyco ™ Endocatch II bag. This opens on a pre-formed metal rim or hoop and takes up to 15cm sized spleens in one bag. Laparoscopic surgery on larger spleens requires division of the spleen intracorporeally (with inevitable spillage of splenic tissue), or use of a larger retrieval bag.

Once the spleen is placed within the Endocatch bag, finger fracture through the 15mm port site will break up the spleen. It can then be removed piecemeal using a combination of sponge holding forceps and a sucker. The patient is then re-laparoscoped to insure haemostasis and closure undertaken in the routine fashion with muscle sutures for all port sites larger than 5mm. There is rarely any indication for a post-operative drain.

Post-operative complications and recovery

An uncomplicated recovery should be very similar to the recovery in a patient who has had laparoscopic cholecystectomy. Any deviation from this suggests post-operative complications.

Any sign of ileus post operatively requires immediate relaparoscopy to check for haematoma formation (more common if there has been pre-operative radiotherapy to the spleen or splenic artery embolisation) or port site hernias. Other complications which are rare but specific to splenectomy include:-

1. Pancreatitis (this may occur if excessive dissection has been undertaken around the pancreatic tail).
2. Gastric perforation (this may be the result of thermal damage if division of the short gastrics is undertaken too close to the gastric wall).

It would normally be safe to drive within 2 or 3 days of surgery and resume most normal activities within 10 days.

Controversies

Splenomegaly and hand assisted surgery

There is no doubt that laparoscopic surgery in cases of splenomegaly is more technically difficult. The best method of removing spleens larger than 15cm long (or over 1kg in wet weight) is still under debate and it may be that hand assisted surgery has an important role in this group of patients.

In their series of 108 laparoscopic splenectomies, Patel *et al* found that splenic weight was the most powerful predictor of morbidity[9]. Logistic regression analysis of their data revealed that the odds of morbidity were increased 14 fold for patients with a splenic weight greater than 1 kg. Targarona *et al* have found that morbidity following laparoscopic splenectomy was higher in patients with spleens weighing over 400 g compared to those less than 400 g.[10] In those patients with spleens > 1 kg, an open approach resulted in a significantly shorter operation, with no significant difference in morbidity. Laparoscopic splenectomy in cases where the spleen weight was > 1kg had a 23% conversion rate and all spleens >3.2kg required conversion. Heniford *et al* compared laparoscopic splenectomy in 60 patients with splenomegaly (>500 g) with 82 patients with normal sized spleens (<150 g).[11] Although there was no difference in complication rate, conversion rate or length of hospital stay between the two groups, there was significantly greater blood loss and the operation time was significantly longer in the group with splenomegaly.

Although initially defined by Goldstone as a spleen weighing more than 1.5kg, other authors have used different definitions of splenomegaly, using weights ranging down to 500 g.[12] In our own study[13], we have chosen to define splenomegaly as a wet

splenic weight of greater than 1 kg. This was the threshold weight at which the odds of morbidity began to increase in Patel's study, and this is also approximately the maximum size that can be accommodated in a single 15cm EndocatchII bag. Spleens bigger than this can be removed in multiple bags, but this requires intracorporeal division of the spleen, which is contraindicated in cases of ITP and AIHA. Alternatively, very large spleens can be removed in one piece through an accessory incision, which can reduce some of the benefits of laparoscopic surgery. To this end there has been a lot of interest in hand assisted splenic surgery for this group of patients [14], [15], [16], [17]. Whilst laparoscopic splenectomy is undoubtedly the treatment of choice for patients who's spleen is less than a kilogram in weight, it is by no means clear what the best approach is in massive splenomegal. Some advocate a laparoscopic approach in all, others suggest had assisted surgery may benefit those with splenomegaly, whilst a third approach is to use open surgery (albeit vastly improved by the application of laparoscopic dissection techniques and equipment). A randomised trial in this area would be a good idea.

Conclusion

Laparoscopic surgery is the treatment of choice for the vast majority of patients who require elective splenectomy. This type of surgery becomes more difficult the larger the spleen and morbidity increases. When introducing laparoscopic surgery to a hospital it may therefore be wise to avoid cases of splenomegaly. Most major hospitals in the UK now have units experienced in laparoscopic splenectomy and the procedure should be offered to all appropriate patients referred for elective splenectomy.

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