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Title

Haematological Splenectomy in University Hospital Waterford: A 10-year Audit and Technical Video

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Conflicts of interest

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To whom it may concern,

First line treatment for haematological and immune disorders (e.g. auto-immune haemolytic anaemia and idiopathic thrombocytopaenic purpura) is medical therapy in the form of immunosuppression. Should the patient fail to improve with first line therapy, splenectomy offers a second line treatment in some patients. University Hospital Waterford (UHW) is the regional haematological unit and we have offered a consult-based service for splenectomy since June 2010. A retrospective analysis of all haematological splenectomies performed in UHW was carried out. The attached video (Video S1) also describes a selection of laparoscopic splenectomies carried out in the department.

A total of 18 splenectomies were carried out for haematological disorders during this time period, all of which were performed laparoscopically. The median spleen weight was 270g (91-1895g) and the median preoperative platelet count was $126x10^{9}/L (3-376x10^{9}/L)$. The mean length of stay was 19+/-22 days and there were no perioperative mortalities.

Regarding the setup, patients receive a general anaesthetic and a nasogastric tube. They are positioned in the Lloyd-Davis position with a wedge under the left shoulder. We use a 30-degree 10mm camera, a Harmonic scalpel, and a laparoscopic stapler with a vascular load. Pneumoperitoneum is obtained via a 12mm supra-umbilical port and three further ports are placed under direct vision. Further technical details are described in the attached video.

Spleen video narration

- University Hospital Waterford is the regional haematological unit and we have offered a consult-based service for splenectomy since 2010
- In this time we have performed 18 laparoscopic splenectomies for haematological disorders
- The largest spleen weighed 2kg and the lowest preoperative platelet count was three

- Here are some examples of the commonest indications for haematological splenectomy. ITP was by far the most common indication in our cohort
- Patients receive a general anaesthetic and a nasogastric tube
- They are positioned in the Lloyd-Davis position with a wedge under the left shoulder and are left side up
- We use a 30 degree 10mm camera, a harmonic scalpel, and an echelon laparoscopic stapler with a vascular load
- Hasson pneumoperitoneum is obtained via a 12mm supraumbilical port and a 5mm port and 12mm port are placed under direct vision
- A further 15mm port is placed out laterally for the endobag and retractor
- All patients get preoperative cross-sectional imaging to outline the hilar anatomy and to define where the splenic flexure sits in relation to the spleen

Video 1

- Each case begins with division of the most accessible peri-splenic attachments
- For the first case, the spleen is retracted anteriorly with a paddle retractor, followed by division of some medial omental adhesions
- The spleen is lifted from below, so that the posterior and lateral attachments can be divided with the Harmonic scalpel
- The pedicle is sequentially skeletalised, and care is taken not to cause any splenic vessel bleeding with the Harmonic scalpel
- The goal is to isolate the pedicle as much as possible to make it accessible to the stapler
- The laparoscopic stapler is used to begin dividing across the hilum
- Here you can see large, branched, hilar vessels becoming visible, These are further dissected out with the Harmonic scalpel, taking care not to cause bleeding
- These large vessels can also be seen on the preop CT image which is overlain here
- The stapler is then used to divide the remainder of splenic hilum, until the spleen is fully resected

Video 2

- This next case highlights some different anatomy in a smaller spleen
- The hilum is again divided with the vascular stapler
- Once division of the hilum is complete, there are still some superior and lateral attachments. These are easily divided with the Harmonic scalpel
- Here you can see the staple line, and as with all cases, the spleen is then extracted in an endobag

Video 3

- Here we have our third, and final case
- Similar to the first case, we begin by dividing the medial omental attachments
- Instead of a paddle, a fan retractor was used
- Again the hilum is gradually skeletalised to allow insertion of the vascular stapler
- After division of the remaining attachments, the spleen is extracted in an endobag

Key points

- Our patients all receive preoperative immunisation
- Ensure to look for, and remove, an accessory spleen
- And do not give platelets until the vessels are clamped. We generally accept platelets over 30, but we are guided by haematology and anaesthetic colleagues
- As always, positioning and retraction are key
- And start with the most accessible attachments, gradually exposing the hilum to facilitate use of the vascular stapler, and avoid causing bleeding with the harmonic scalpel