

## **AUGIS Travel Fellowship Report**

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### **Oesophago-gastric resections in Hong Kong**

Visiting Professor Simon Law – Queen Mary Hospital and Mr. David Leung – United Christian Hospital

In March 2017 I had the opportunity to visit Professor Simon Law at Queen Mary Hospital (QMH) and Mr. David Leung at United Christian Hospital (UCH) in Hong Kong (HK). Being attached to two hospitals gave me the opportunity to observe four full-day resectional lists every week, alongside endoscopy. Hong Kong has a high incidence of oesophagogastric (OG) cancers, and Prof Law's OG Unit is a paragon with exemplary long-term survival data and one of the lowest morbidity and mortality rates after oesophagectomy in the world. In this summary I aim to compare what I have observed and learnt about surgical training and OG resections in HK to my experience in the UK.

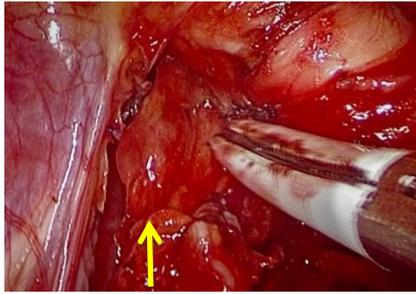
### **Surgical training in Hong Kong**

Surgical training in HK comprises one year internship (FY1 level in the UK) then two years BST (CT1-CT2), followed by four years HST (ST3-ST6), culminating in 1-2 years in a post-FRCS Fellowship. Training in HK demands a degree of resilience familiar to pre-EWTD Calman-trained surgeons in the UK. Interns, BSTs, HSTs and Fellows work 2.5 weekends a month, and when on-call they work continuously for 24 hours (or 48-hour weekends) and straight into a normal working day the next day. Due to the large number of endoscopies, the entire team is involved, such that an FY2 equivalent had performed in excess of 100 diagnostic OGDs on her own, albeit supported by Fellows and Consultants running adjacent parallel sessions. BSTs are taught to perform bedside ultrasound for gallstones and free fluid when on-call, whilst HSTs are taught therapeutic OGDs and colonoscopies. With such substantial experience (approximately 700 OGDs per month in Prof Law's unit alone), all OG Consultant Surgeons in HK do EMR, ESD, EUS, RIG, RIJ, manometry, stenting, dilatation and POEMs (preferred choice of treatment for achalasia in HK) themselves.

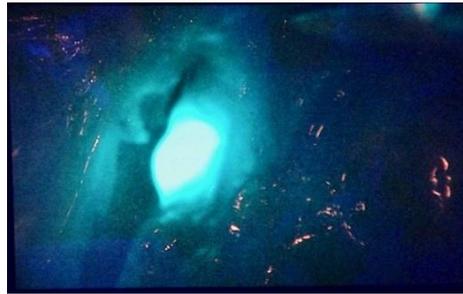
### **Minimally invasive oesophagectomies (MIOs)**

The OG department at QMH is spearheaded by Professor Simon Law, who is involved in all oesophagectomies. As a unit with 3 OG Consultants, they perform around 50 oesophagectomies (80% of these as MIOs) plus 75 gastrectomies a year (80% laparoscopically). These figures are different to our most recent UK OG audit where 41% of oesophagectomies and 14% of gastrectomies were performed using a minimally invasive approach<sup>1</sup>. As the tumours in HK are mainly squamous cell carcinomas (>90%) and mid-oesophageal, a 3-stage resection with a cervical anastomosis is routinely performed.

The theatre is OR1 ready with laminar flow, complete with multiple pull-down screens and HD stack systems. All OG resections commence with an OGD and injection of a fluorescent dye (indocyanine green, ICG) peri-tumourally (submucosally) for brightly fluorescent visualisation of the regional lymph nodes (LNs) during thoracoscopic resection to ensure the completeness of lymphadenectomy (Fig. 1a-b). It is effortless to alternate between standard Xenon white light and fluorescence imaging mode intraoperatively by pressing a button on the endoscope for stunning contrast images which readily detect any potential LNs still lurking within the operative field.

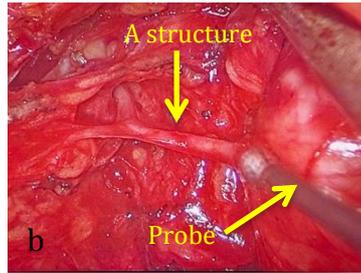
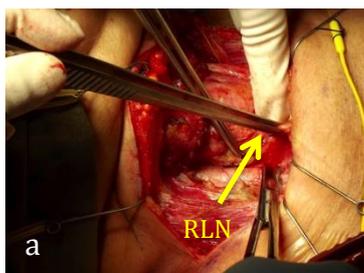


1(a) During white light thoracoscopy – is this a draining LN? Or just fat?



1(b) In fluorescence mode with ICG, it is confirmed as a draining LN which thus needs excision

Surgery commences with a neck dissection to identify the recurrent laryngeal nerve (RLN, Fig. 2a) and the implantation of a nerve stimulator for nerve mapping and continuous RLN nerve monitoring during thoracoscopic upper oesophageal dissection (Fig. 2b-c). This allows a more aggressive nodal dissection. VATS is then carried out via three ports plus a mini-thoracotomy (Fig. 3a-c). The average lymph node yield from MIOs is 45. Thoracoscopic dissection is then followed by laparoscopic gastric mobilisation which is combined with a mini-laparotomy for gastric tubularisation, culminating with a retrosternal delivery of the gastric conduit for a hand-sewn (continuous, single layered) O-G neck anastomosis.



**Fig. 2** (a) Pre-operative localisation of RLN for nerve mapping and continuous nerve monitoring, (b) during thoracoscopic dissection, a probe is utilised to identify if a structure encountered is actually the RLN, a question which is answered (c) both auditorily and sinusoidally by the amplitude of the voltage gained on contact



**Fig. 3** (a) Set-up for thoracoscopic dissection, 3 ports + mini-thoracotomy (b) for lung retraction and suction, (c) patient on the left lateral position with Prof Law operating behind the patient

Following laparoscopic gastric mobilisation (set-up as in Fig. 5a), a mini-laparotomy is performed in order to carry out their routinely-performed pyloroplasty and gastric tubularisation. Intravenous ICG is then administered and fluorescence imaging via a SPY laser imaging system (Novodaq) visualises the viability of the conduit prior to oesophago-gastric anastomosis (ICG angiography, Fig. 4a). This enhances the ability to objectively assess conduit perfusion intra-operatively in real-time (Fig. 4b). I found the benefits afforded by this cutting-edge fluorescence imaging technology extremely useful because it provides

clear demarcation of non-viable areas on the conduit which could otherwise be unintentionally incorporated into the O-G anastomosis as they may appear satisfactory to the naked eye. SPY has been used for fluorescence imaging at QMH for past two years and has revolutionised their practice.



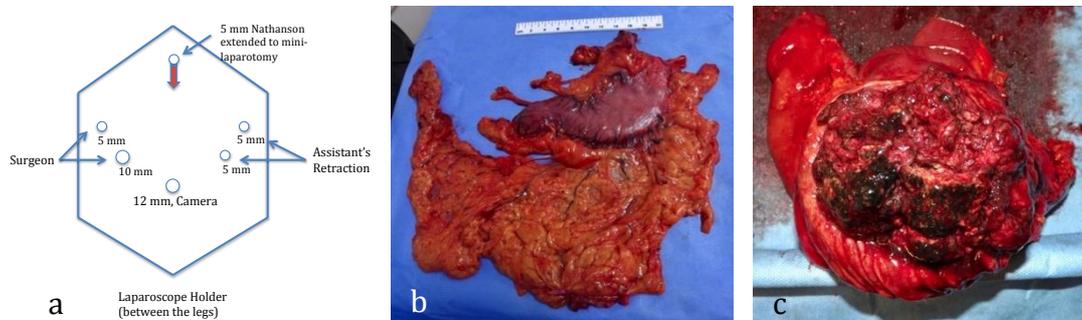
**Fig. 4** Assessing the viability of the gastric conduit. (a) External view of gastric conduit during laser fluorescence imaging (b) Live images from fluorescence imaging of the gastric conduit with a perfusion-deficient area

A retrosternal conduit route is preferred, as Prof Law has noted a reduced incidence of delayed gastric emptying in comparison to the orthotopic position. They do not use feeding jejunostomies, probably because a cervical leak is arguably less morbid and easier to manage than an intrathoracic one. A single “Blake” basal sump drain on free drainage is used, which includes a suction pump. Prof Law does not feel it is necessary to insert a prophylactic apical drain for potential pneumothoraces. This single Blake drain is very light and flexible, with a reduced caliber, and does not need an underwater seal. Consequently, patients can carry it around easily because it is more comfortable and less cumbersome than conventional underwater-seal drains. Blake drains may be used just as effectively for both air and fluid within the pleural cavity. Patients are usually discharged on Day 7-8. [Median length of stay for MIOs is 11 days, and 13 days for open/hybrid oesophagectomies in the UK<sup>1</sup>]. Oral contrast swallow studies are not performed. Should there be a clinical suspicion (e.g. new AF, tachycardia or pyrexia), an OGD is done preferentially.

#### Laparoscopic gastrectomies

The set-up used in HK is shown in Fig. 5a. Again, ICG is injected peri-tumourally endoscopically just before surgery for intraoperative LN recognition. Peritoneal cytology is performed immediately prior to dissection. A Maryland ligasure is used for all OG dissections. A bursectomy is not done as the results from the Japanese JCOG1001 study<sup>2</sup> have found that although the operative time increased with bursectomy, this did nothing to improve LN yield, alter mortality or affect overall survival even in cT3 or cT4 gastric adenocarcinomas. Although distal gastrectomies are more common in HK, a total gastrectomy is discussed here as it is the more complicated procedure. Following a D2 dissection (Fig. 5b), the oesophagus is divided with an Endo-GIA, then an Orvil is passed into the oesophagus while a CEEA circular stapler is inserted into the jejunum via a mini-laparotomy in the epigastrium. Where a sutured anastomosis is performed (OJ or JJ anastomosis), big bites of full thickness have, in their experience, dramatically reduced the incidence of leaks. Interestingly, for Siewert II (junctional) tumours, a total gastrectomy is performed in HK (and in Japan), instead of an oesophagectomy, which is more commonly

practiced in the UK<sup>1</sup>. Due to the incidence of submucosal lymphatic spread it is thus mandatory for them to send the proximal resection margin for frozen section. Patients are discharged on Day 3 (subtotal) or Day 4 (total gastrectomy) [Median length of stay for lap. gastrectomies is 8.5 days in the UK<sup>1</sup>]. NG/NJ tubes are not routinely used in gastrectomy patients. Pre-op carbohydrate loading drinks are used to enhance recovery after elective gastrectomy. Their post-operative complication rate is < 5%.



**Fig. 5** (a) Standard port placements for laparoscopic gastric mobilisations/resections in HK (b) a total gastrectomy specimen, and (c) a circumferential cancer occupying the entire stomach

I am grateful to AUGIS for helping to make this Fellowship possible, and would recommend it to anyone with an interest in minimally-invasive OG resections.

## References

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Prof Simon Law & team



Simon Law



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