

## P428 – Training

### HELIOS – THE HEIDELBERG LAPAROSCOPIC INTERVENTION AND OPERATION SIMULATOR

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**Aims:** Training of young inexperienced surgeons in a safe environment is an important issue of today's laparoscopic education. Additionally to the improvement of patient safety, the purpose is a reduction of training in the operation room, which is quite expensive. Due to economical pressure the provided training material does not only have to be cost effective but also has to maximise training efficiency by providing a highly realistic training environment. We developed a modular training phantom for abdominal interventions, which is easy to reproduce and benefits from advantages in anatomical and haptic realism.

**Methods:** The information about 3D anatomy was extracted from the CT-scan of a young male using semiautomatic segmentation of all important organs and vessels. The resulting models were produced using a 3D printer and moulded in silicone afterwards. The resulting negative image was then filled with a coloured soft silicone to form the positive copy of the formerly printed organ. For the bowel a pipe was used as a mould. The body cavity was segmented, too, and produced using selective laser sintering. To enable the usage of common laparoscopic instruments and trocars for training an abdominal wall consisting of three different layers was fixed to the solid body cavity. Reproduction accuracy was evaluated by comparison of CT-scans of the produced organs and the original CT-data.

**Results:** All abdominal and pelvic organs were produced using the described techniques. For the complex rectal organ the medium difference of the surfaces reconstructed from CT was only 2 mm. The abdominal wall was airtight and allowed for application of a carbon-dioxide pressure appropriate to laparoscopic surgery.

**Conclusion:** The approach of rapid prototyping is suitable for producing anatomically realistic organs. By selection of different silicones various haptic properties can be achieved. This results in realistic properties of the phantom and therefore might improve training efficiency and outcome. Further development needs to be conducted to provide breathing and vascularisation for even more realism.

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### FEASIBILITY AND ACCESSIBILITY TO THE LAPAROSCOPIC PROCEDURES IN UNIVERSITY HOSPITAL OF KINSHASA

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The authors present an experimental work entering a project of development of the laparoscopic procedures in RDC adapted to the conditions of developing countries, outlines of her development as well as first elements of feasibility and the realized procedures.

In partnership with the Fallen of Liège, formative, and Wbi, landlord of funds, a team completes, surgeon, anaesthetist and nursing was trained in Belgium then after locally in RDC. Of the equipment of laparoscopy adapted in the conditions of Africa was supplied and a mission of accompaniment made to share and resolve the operational difficulties bound to this new contribution.

From december 2009 to december 2011, 116 surgical operations by laparoscopy were realized since the beginning of this program, of which 32 appendectomy, 41 cholecystectomy, 11 hernia repairs, 9 laparoscopy explorers for peritoneal carcinoma assessment and biopsy, 8 procedures for catheter of dialysis peritoneal, 5 gynecologicals procedures, 2 laparoscopy for management of generalized peritonitis, 4 procedures for adhesiolysis, 1 procedure for acute occlusion's small bowel, 1 drainage of liver abscess, 1 cure of rectal prolapse, and 1 cure of cystocele. Are analyzed age, sex of patients, hospital stay, evolution, the average cost of procedures compared to the traditional approach of laparotomy. The laparoscopic approach appears to be beneficial in economic terms for some procedures in this environment of low-income population.

The authors conclude that an joined approach, taking into account on one hand the training of the skills locally trained to adapt itself to some difficulties, on the other hand institutions of scientific support and a real program and local will of development of this new procedure are the wages of development, accessibility and durability of such news approach in developing countries.

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## P430 – Training

### TRAINEE INVOLVEMENT IN MAJOR GENERAL SURGICAL OPERATIONS IN A DISTRICT GENERAL HOSPITAL SETTING

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**Aims:** To assess the involvement of a higher surgical trainee as primary surgeon in major general surgical operations.

**Methods:** A prospectively-maintained database of all cases at our institution was interrogated and all emergency laparotomies and elective colorectal resections were identified. Oesophago-gastric resections for cancer were all performed by a consultant and were not considered in this series. Primary surgeon, operating time, oncological outcomes (where relevant) and urgency of surgery were measured. Chi-squared tests were used to compare groups; student's t-tests were used to compare continuous data.

**Results:** From August 2011 to November 2011, 125 major cases were performed. There were 74 men (60%); median age was 66 (range, 18–92) years old. A consultant was primary surgeon in 98 cases (79%). A registrar was primary surgeon in all other cases. Amongst consultant-led operations, a registrar was first assistant in 80 cases (82%). Emergency operations accounted for 64 cases (51%). Primary pathology was most commonly colorectal cancer (66 patients, 54%), small bowel ischaemia or obstruction (20 patients, 16%) or diverticular disease (12 patients, 10%). There was a significant difference in primary operating surgeon when stratified into urgency of surgery and primary pathology. Consultants were more likely to be primary surgeon if primary pathology was cancer (57 patients operated by consultant vs. 9 patients operated by registrar,  $P < 0.001$ ) or diverticular disease (9 patients vs. 2 patients,  $P < 0.001$ ). Trauma cases and laparotomy for appendicitis were significantly more likely to be performed by registrars. The majority of registrar cases were emergency cases (23 patients as emergency vs. 4 patients as elective,  $P < 0.001$ ).

**Conclusions:** The volume of major general surgical operations in our district general hospital setting was high with over 30 major cases per month. There was good training exposure for registrars in major cases with 86% of cases involving a registrar as either primary surgeon or first assistant. Careful rota management and appropriate allocation of registrars to specific operations, as in our hospital, can maximise training opportunities.

## P431 – Urology

### COMPARISON BETWEEN THE HEMODYNAMIC PARAMETERS DURING LAPAROSCOPIC RESECTION OF ADRENAL AND EXTRA-ADRENAL PHEOCHROMOCYTOMAS

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**Objectives:** Laparoscopic resection of extra-adrenal pheochromocytomas (EAP) is a meticulous surgical procedure due to changes in anatomical disposition and proximity to major blood vessels. Complete resection can be relatively traumatic and may cause increased increment of catecholamines. We present our experiences during laparoscopic resection of EAP (LEAP) and compare intraoperative hemodynamics with those during laparoscopic resection of adrenal pheochromocytoma (LAP).

**Methods:** Between October 2001 and October 2011, 5 patients underwent LEAP (retrocaval EAP, n = 2; intra-aortocaval EAP, n = 1; periadrenal EAP, n = 2), and 5 patients underwent LAP. We also examined the range of blood pressure (BP) fluctuation during surgery.

**Results:** Tumors in the LEAP group were significantly larger than those in the LAP group (mean 4.8 cm, range 3.9–7.0 cm vs. mean 2.9 cm, range 2.5–3.7 cm). In both groups, the tumors were successfully removed laparoscopically without any need for conversion or blood transfusion. During surgery, arterial BP reached higher levels in the LEAP group ( $221.6 \pm 52.5$  mm Hg; range 160–299 mm Hg) than in the LAP group ( $200.4 \pm 43.1$  mm Hg; range 140–262 mm Hg). Intraoperative hypertension (BP >200 mm Hg) occurred in 3 LEAP and 4 LAP group patients. Intraoperative hypotension (BP <80 mm Hg) occurred in 5 LEAP and 3 LAP group patients. However, these differences were not significant.

**Conclusions:** We are confident in stating that LEAP is a feasible and reproducible technique with less traumatic laparoscopic dissection and appropriate preoperative planning, as with LAP. To ensure ideal preparation of patients undergoing LEAP, very close communication between the endocrine, surgical, and anesthesia teams is essential.