Empowering Laparoscopic Surgery in Mutolere

Report of a visit to

Uganda

1 September 2023 – 20 September 2023

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Background

Uganda, the “Pearl of Africa” is a country with some famous and stunning natural wonders. Lakes, mountains and volcanoes provide breathtaking scenery. Mountain Gorillas in the Bwindi Impenetrable National Park and golden monkeys in the Mgahinga Gorilla National Park are just two of the impressive species of the country.

The name Uganda originates from the kingdom of Buganda, which encompasses a large portion of the south of the country, including the capital Kampala. Although English is the official national language, Luganda is widely spoken throughout the country.

In contrast to the beautiful scenery is Uganda’s poverty. Uganda is one of the poorest nations in the world. Despite making enormous progress in reducing the countrywide poverty incidence from 56 percent of the population in 1992 to 24.5 percent in 2009, poverty remains deep-rooted in the country's rural areas, which are home to 84 percent of Ugandans. People in rural areas of Uganda depend on farming as the main source of income. In addition to agricultural work, rural women are responsible for the caretaking of their families. To supplement their income, rural women may engage in small-scale entrepreneurial activities such as rearing and selling local breeds of animals.

The health care system in Uganda is known to be under several strains. The government's failure to improve the compensation of doctors, as well as failing to conduct a review of the supply of medicines and other equipment in health centres across the country effectively paralyses quality- and accessibility of care in governmental hospitals.

Saint Francis Hospital, also known as Mutolere Hospital, is situated in the rural area of Kisoro, in the south west of Uganda near the Rwandese, Congolese border. It is situated in a beautiful green area with 3 proud volcanoes of the Mgahinga Gorilla national park towering high above the hospital area. It was founded and run by the Franciscan Sisters of Breda (The Nederland’s) as a church based voluntary health centre under the Catholic Diocese of Kabale. In 1994 it was handed over to the board of Trustees of Kabale Diocese. St. Francis Hospital, also called Mutolere Hospital is a 210-bed capacity private, nonprofit community hospital that serves the the people (200.000) of the Kisoro district, the neighbouring districts of Rukungiri, Kanungu and Kabale and in this task is of great additional value to the governmental Kisoro Hospital. In addition, a percentage of patients are from across the border of the Democratic Republic of Congo and of the Republic of Rwanda and thus also providing health to war victims and refugees.

The mission set by Mutolere hospital is a holistic, integrated and sustainable action in health. Prevention, health promotion and treatment for the less privileged and vulnerable is striven for. By training health workers. Medical staff consist of mainly Ugandan doctors, nurses and paramedical workers. Much is undertaken to have a good quality standard of care through teaching, knowledge exchange, international collaboration and training. Materials and medicines are provided.
For the international collaboration in teaching, training and support in direct patient care the foundation " Friends of Mutolere Hospital" was founded.

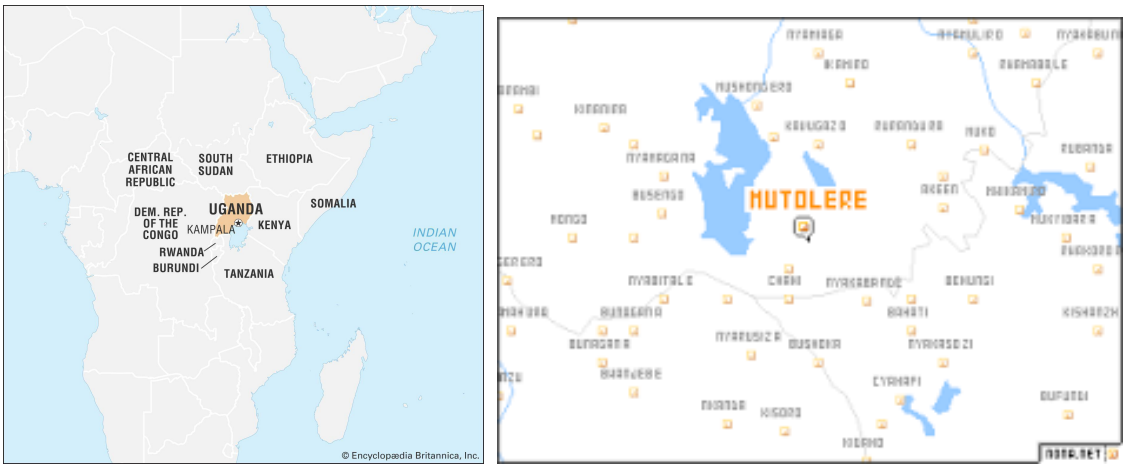


Fig1. Map of Uganda and Mutolere in Kisoro district

Foundation Friends of Mutolere Hospital

" Foundation Friends of Mutolere Hospital" has set the goal to be involved in hospital policy plans and sponsoring of several projects. For international collaboration, teaching and training Mutolere Hospital is visited by several teams yearly. Disciplines differ from physiotherapists, OR nurse teams, project coordinators to surgeons. (vriendenvanmutolerehospital.and website mutolerehospital.ug).
The collaboration between "Foundation Friends of Mutolere Hospital" and St. Francis hospital is based on mutual respect. In mutual consultation projects are selected to empower local healthcare workers and therewith improve the healthcare level. Projects are chosen that can be realised through funding and missions by " Foundation Friends of Mutolere Hospital". Focus is teaching, training and support in direct patient care but also renovation of hospital wards or outpatients buildings were needed.

History of Laparoscopic Projects

In the past there have already been laparoscopic training initiatives. The gynaecologist of Mutolere Hospital, dr. Jerome, has visited India to get experience in gasless laparoscopy. In July 2022 dr. Gnanaraj from India held a workshop on gasless laparoscopic surgery co-assisted by friends of Murolere.

At that time, a complete and well-functioning laparoscopy tower with all the needed equipment, monitor, camera, light source, CO2 insufflation was donated by Prof. Winfried Rosmanith from Germany.

With both initiatives the feasibility of performing laparoscopic surgery in Mutolere hospital was created, gasless in case of shortage of CO2 cylinders and with the possibility of a pneumoperitoneum when available. In addition, the gasless technique can be used in case laparoscopy is wanted in combination with spinal anaesthesia.

In order to make sure all equipment would be functional " Foundation Friends of Mutolere Hospital" sent 2 groups of 2 Dutch theatre assistants preparing the equipment, connections, surgical instruments, handling, and sterilising process, so that during the interventions there would be no unexpected events. Especially the support of the theatre staff towards the local staff in handling this sometimes-complicated equipment was very much appreciated.

The training consisted of presentations about equipment and procedures, training on an Endo trainer and procedures in theatre for local staff, surgeons, gynaecologists and 4 colleagues from Kabale. The cooperation with doctors from Kabale hospital provides many advantages for future teaching and further cooperation on laparoscopy. During this visit several procedures were performed, mainly in the field of gynaecology and urology.

The conclusion of these initiatives was that further development of laparoscopy in Mutolere is certainly feasible. Several aspects were agreed on:

- basic laparoscopy course is needed for all doctors starting these procedures
- laparoscopic surgery best be performed by two specialists

- further training in Kampala and/or coaching by visiting specialists in Mutolere will be very helpful in developing further skills
- good cooperation in the region, especially with senior surgeons and gynaecologists in Kabale will be very helpful and important for training and quality support
- involving theatre staff in maintaining equipment and preparation of procedures is important
- some equipment issues, eg clip applier can be easily solved within Uganda by local purchase

Laparoscopic Project 2023

This year (2023) the mutual wish was to refresh and extend laparoscopic abdominal surgical procedures to Mutolere. The previous initiatives have led one gynaecologist, dr. Jerome, to perform diagnostic laparoscopic procedures, with- and without the use of a pneumoperitoneum. Now the wish was to take it to a next level with more doctors participating and to introduce laparoscopic interventional surgery for general surgical purpose. In January 2023 preparations were undertaken to send surgeon dr. Sandra Donkervoort to Uganda for a three-week training in September. The intention is to have a yearly- or half yearly training program to ensure implementation of the knowledge and skills to perform a variety of laparoscopic abdominal procedures in the field of both general surgery and gynaecology. The teaching and implementation again concern the whole Ugandan medical team consisting of the anaesthesiologists, OR nurses, surgeon, gynaecologists and ward nurses. The focus lies on implementation of laparoscopic surgery to the whole team to strive for multidisciplinary quality and to create a profound support base. To focus on laparoscopic surgery as a team effort the learning curve will be passed together and will empower each team member. The ambition is to introduce a variety of abdominal procedures for surgical and gynaecological care. We will step by step increase the complexity of the procedure according to the skills obtained by the whole team. It speaks for itself that this will also be dependent on the materials at our disposition. With the implementation of more complex procedures the need for more advanced devices will increase.

Medical instruments

An analysis of available instruments at Mutolere hospital for laparoscopic procedure in September 2023 will be discussed below.

Access surgery: instruments for both open and veress-needle introduction are available. Pneumoperitoneum and non-pneumoperitoneum techniques are possible. For pneumoperitoneum big cylinders of co2 are available with pressure monitors.

Fig. 2 Insufflator and light source

The insufflator pump/monitor is connected to the CO2 cylinders. A light source with cable and laparoscope is available and can be connected to one bigger- and one smaller portable television screen. Trocars are available 10 and 5 mm, disposable and non-disposable. Both are without balloons and of the older type.

Diagnostic procedures: The television, scope and trocars make it possible to do a diagnostic laparoscopy using additional port with a traumatic- and atraumatic grasper and a Maryland

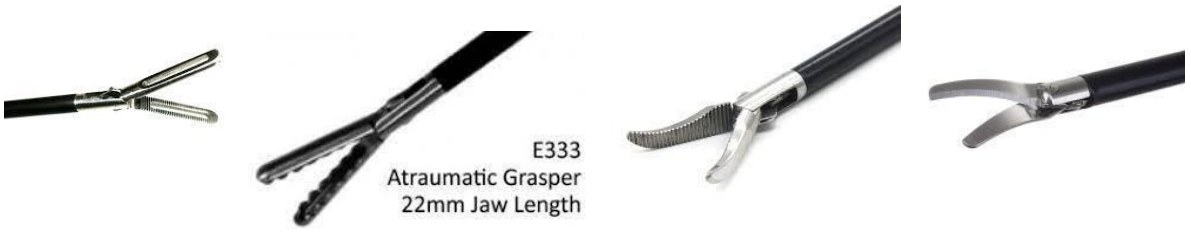


Fig 3 Instruments available in Mutolere hospital

Interventional procedures: Scissors, unipolar- and bipolar instruments are at our disposal for small vessel haemostasis. An Erbe Electrocautery energy source is used. This can be used in combination with a hook or bipolar diathermy grasper.

A Needle retractor for intracorporeal knotting is available for haemostasis of bigger vessels and suturing of GI-perforations. In addition, a knot pusher can be used.

Number of procedures daily and sets. There is 1 complete set of instruments available. Sterilisation of the set is possible but takes a few hours. Sterilisation is not possible during lunch hours and after 17.00 because sterilising personnel is on leave. Therefore, the maximum number of procedures daily are 2 if planned and managed well. Sterilisation before lunch could make a second laparoscopy possible at 15.00-16.00 hours.

A number of instruments are available in multiple numbers. If an additional scope and an additional CO2 tube for insufflation would be available 2 laparoscopic sets can be organised. This will make laparoscopy more flexible and better equipped in case of a higher patient load than one a day.

Collaboration

The collaboration with the surgeons of Mutolere hospital, in introducing laparoscopy is very promising: the dedicated, well-trained surgical team and the willingness to learn, provides a good setting for knowledge and skill exchange.

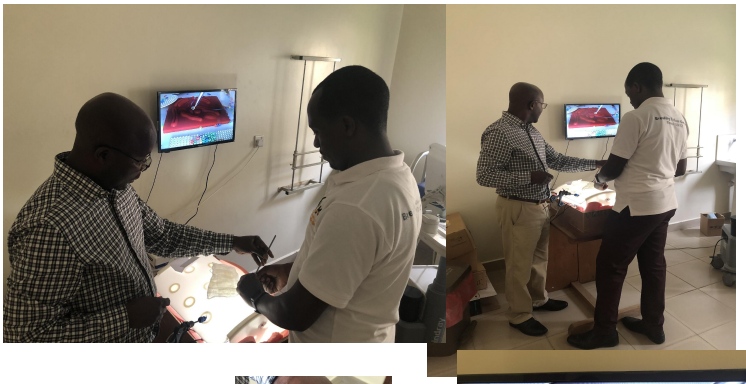
This year, the focus was on introducing diagnostic laparoscopy in the general surgical field.

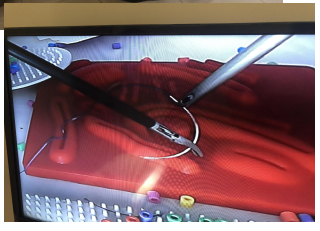
After an assessment of instruments available, the week schedule of the surgeons and how to select suitable patients a plan was made. This has led to the following set up:

- **A weakly presentation with the scope**:
  - First week: trocar-introduction and morbidity, insufflation and OR set up. Video presentation.
  - Second week: morbidity laparotomy, benefit LS, possible procedures, contraindications and physiological change during LS
  - Third week: pre and post op care with Early warning signs (EWS), instruments and port position.

Aim: Background knowledge on surgical strategy, team effort, anaesthesia related care, surgical effects on morbidity and awareness of healthcare gain of diagnostic and interventional laparoscopy.
Participants: surgeon, gynaecologist, anaesthesiologists, medical doctors and OR nurses (second row, not shown on the picture)

- **Endotrainer:** Training and teaching of instrument handling and suture techniques.
  Aim: Brain-eye coordination, 2-dimensional feel of 3-dimensional procedure, instrument handling and intra- en extracorporeal knotting
  Participants: gynaecologist, surgeon and surgical resident.





- **Bedside teaching**: Triage of suitable patients and post -operative care with focus on early mobilisation, reduced pain medication and early discharge.

Aim: Practising "Early warning signs" (EWS)) for triage of septic patients with abdominal pathology. Discussing patients' pathology, surgical procedure done and anticipation/awareness of possible complications as a result form that procedure.

Participants: Head nurse of the OR and less experienced OR assistants were instructed on all instruments.

Checklist before each procedure was discussed. Co-trainer was dr. Jerome, gynaecologist.

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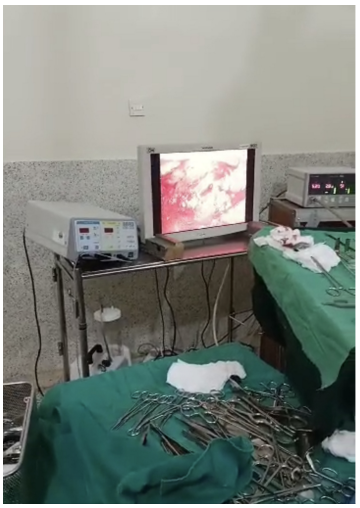
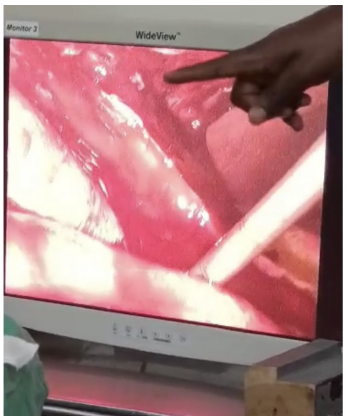
Bedside teaching

- **Laparoscopic surgery on the OR**: training of different introduction techniques, diagnostic procedures and interventional strategies. Focus on safe positioning, surgical strategies needed for different surgical procedures. Hands-on procedures were performed with local surgeons, anaesthetists, OR-assistants and the medical doctor from the Netherlands. Supported by Gynaecologist as trainer and supervisor of OR assistants.





Procedure Done

Done untill now

Pre op diagnose	Per op diagnose	gain
1. Acute appendicitis 2. Painfull Hernia post injury 3. Acute abdomen,mass RA	NSAP No intra-abdominal pathology Localised infiltrated Pathology	No laparotomy Incision 3-4 cm RUA, no laparotomy Transverse incision, no laparotomy
4. Suspected invagination 4 year old girl	Malrotation , no pathologie	No laparotomy
5. Acute abdominal pain, suspected of adhesional strangulation, 4 wks after laptomy	Many strong adhesion with an ischaemic jejunal loop	Laparoscoipc guided laparotomy avoiding iatrogenic lesions smal intestine
6. Abdominal abces, C.A? 1,5 years after surgery	brown abces subphrenic, no C.A	Laparosopic drainage
7. Appendicular infiltrate with abces	Abces appendx	Lap App, no laparotomy
8. Suspected Hirsprung in 4 year old	Some signs, biopsies taken	Biopsies , no laparotomy

Triage procedure

Only in patients in whom a laparotomy was indicated were considered for a diagnostic Laparoscopy followed by an intervention if needed. The usual diagnostic work-up in the Mutolere hospital was done when available. Diagnostic work up with both echography and CT-scan is usually available. The possibility of diagnostic laparoscopy did not replace this work up unless unavailable at that moment or in cases of clear abdominal disease without a diagnosis despite work up.

Laparoscopic procedures were trained according to the last evidence on the topic described in the National Dutch guidelines “Minimally invasive Surgery/laparoscopy” (MIC 2021).

Take home message

From this visit, some recommendations are made to improve the knowledge and skill exchange.

- Develop a specific manual with description of the equipment available and suggestions for materials to bring for specific returning missions.
- A Report visit after every visit on laparoscopy to be used in preparation of the next visit. This will give information on previous set goals, level reached and materials needed to set new goals.
- A visit of minimum 3 weeks is preferred to make progress preferably once in 6 months to make progress and secure obtained knowledge and obtained skills.
- Do a combined mission with an anaesthesiologist to ensure anaesthesia quality during longer procedures.
- Prepare the mission with patient selection prior to visit.

The goals for the next visit:

- Prepare and select patients before the visit
- Strive to have 2 complete laparoscopic set (ad 1 scoop and 1 CO2 tube)
- To strive for a clipper, endoloops and a sealing device to reduce OR time and extend the training to more complex procedures.
- Extend training to more complex procedures in the field of General surgery and Gynaecology

Conclusion

The chosen project of Laparoscopic Surgery has been a successful project. With presentation's, training on the Endo-trainer, OR-nurse training, bedside teaching and 8 laparoscopic surgical procedures a foundation has been laid for the Ugandan surgeon and gynaecologist to both perform diagnostic laparoscopy and do low complex procedures.

By performing laparoscopic surgery together, we gained a lot during the visit. We were able to avoid a laparotomy in all except for one patient. Unexpectedly, the start has been made with interventional laparoscopy. This progress can be attributed to the dedication of all team members, the highly skilled surgeon's and the eagerness to learn.