Empowering Laparoscopic Surgery in Mutolere

Report of a visit to

Uganda

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Backround

Uganda, the “Pearl of Africa” is a country with some famous and stunning natural wonders. Lakes, mountains and volcanos provide a 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.

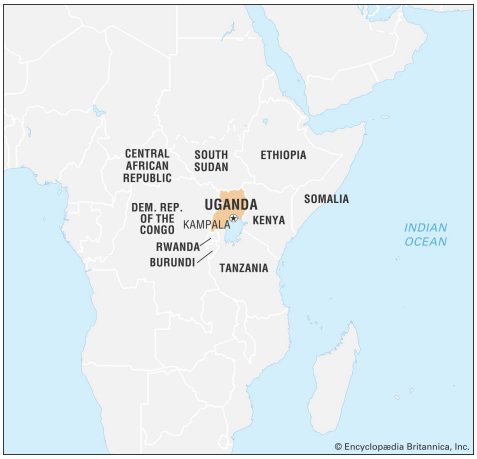
The name Uganda originates from the kingdom of Buganda, which encompasses a large portion of the south of the country, including the capital Kampala. Although English is the official national language Luganda is widely spoken throughout the country.

In contrast to the beautiful scenery stands 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 centers 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 boarder. 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, is a 210-bed capacity private, nonprofit community hospital that serves the people (200.000) of the Kisoro district, the neighboring 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 victim’s 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 of health workers. Medical staff consist of mainly Ugandan doctors, nurses and paramedical workers. Much is under taken 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” was founded.



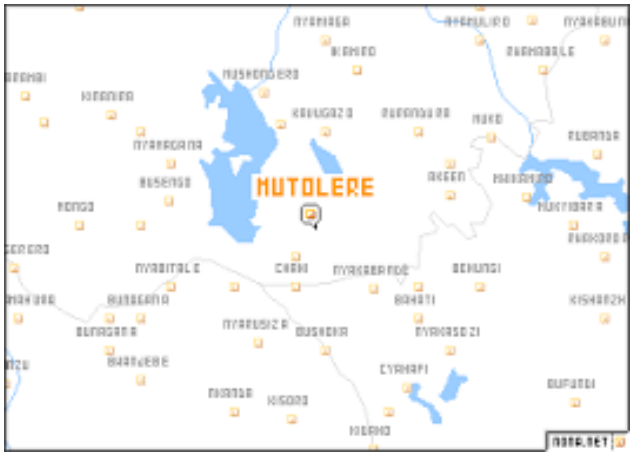


Fig1. Map of Uganda and Mutolere in Kisoro district

Friends of Mutolere

Foundation “Friends of Mutolere” 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 ‘Friends of Mutolere’ 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 realized through funding and missions by “Friends of Mutolere”. Focus is teaching, training and support in direct patient care but also renovation of hospital wards or outpatients’ building were needed.

History of Laparoscopic Projects

In the past there have already been laparoscopic training initiatives. The gynecologist 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 Mutolere. At that time, some well-functioning laparoscopy equipment was donated by Prof Winfried Rosmanith from Germany such as a monitor, camera, light source, CO2 insufflation. The first fundament was laid for the feasibility of performing laparoscopic surgery at Mutolere hospital, 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 anesthesia. In order to make sure all equipment would be functional Friends of Mutolere send 2 groups of 2 Dutch theatre assistants preparing the equipment, connections, surgical instruments, handling, sterilizing 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 conclusion of these initiatives was that further development of laparoscopy in Mutolere is certainly feasible.

To instruct on diagnostic laparoscopy and basic interventional procedures a new mission was done by laparoscopic surgeon, miss dr. S Donkervoort in September 2023.
A program was enrolled for knowledge sharing, bedside teaching, training of laparoscopic skills on the endo trainer and laparoscopic procedures on the operation room. Eight surgical procedures were performed in patients in whom a laparoscopic approach was thought suitable. In 7 cases a laparotomy could be avoided.
The experience during the visit in 2023 led to some recommendations to improve the knowledge, skill exchange and equipment needed for interventional procedures. The most important were; develop a specific manual with description of the equipment and suggestions for materials to bring for specific returning missions, extend the time of the visit for more impact and progress, repeat mission interval preferably once in 6 months to secure obtained knowledge and skills and

prepare the mission with patient selection prior to visit. A combined mission with an anesthesiologist to ensure anesthesiologic quality during longer procedures is very welcome.

Goals set for mission in 2024

With this in mind a next visit was set for February-March 2024. The goals set for this visit were:

- Prepare and select patients before the visit
- Strive to have 2 complete laparoscopic sets
- To strive for a clipper, endoloops and a sealing device for safer surgery, to reduce OR time and extend the training to more complex procedures.
- Extend training to more complex procedures in the field of general surgery as well as gynecology and create a collaboration between specialties.

Preparation:

Patient recruitment and selection

Efforts were made to try to organize the laparoscopic mission in advance. Awareness among patients and doctors was risen in January 2024. Possible laparoscopic procedures were discussed in advance and patient selection took place for which the Dutch tropical docter Niels Jansen did the coordination in advance.

@Lay out Katinka Crolla, pediatric nurse, mutolere hospital

Instruments

To be able to reach the set goals a financial funding application was done November 2023. It was very clear that for more complex surgeries more and better instrument were needed. The existing setting, equipment and materials were not sufficient to do more and complex interventional surgery. An analysis of what was needed to do proper and safe laparoscopic surgery (LS) led to a wish-list. A financial overview was made to be able to buy these instruments. A funding request led to a substantial donation by the Hoffknecht-Van Vuure foundation (https://www.kennisbankfilantropie.nl/anbi/hoffknecht-van-vuure-stichting).

Investment Strategy

In the first week of the mission at Mutolere hospital a second inventory was undertaken together with head of OR miss Nyiramugisha Winfred to decide what was available and what was urgently needed. It was decided on which instruments were most important to improve the laparoscopic surgical setting and safety.

- It was clear that instruments for preparation, dissection and coagulation were needed. It was decided on to only obtain reusable instruments. This was decided to be sustainable but also to be able to continue LS at low future costs.
- It was decided on to pursue local purchase to empower local bossiness and to have local support and guarantee in case of problems
- Buy the absolutely needed first and extend the purchase after try out.

Policy changes

After the try-out of instruments and the first several procedures, lessons were learned. Because of these lessons our purchase strategy changed. Lessons learned were:

- Reusable sealing devices are not on the marked yet (locally as well as in Europe).
- The suction system at Mutolere hospital was unsuitable and of low quality
- The high incidences of hepato-splenomegaly stressed the need for tissue retraction instruments
- Because of logistic reasons of sterilization and because of the progression in learning curve of both surgery and gynecology more than 2 sets of instruments were needed for efficient use and patient care.

- For safety of the patient during more complex procedures an adequate ventilator machine is needed. For now, the anesthesiologist is ventilating by hand. Monitoring the end tidal Co2 and have an automatically correction of the breathing rate in cases of increased end tidal Co2 is essential. Therefore, it is currently analysed if the remaining amount of funding can/may be invested in a proper ventilator.
- To make OR setting more suitable for more complex- and a higher variety of surgical procedures mobility of equipment is highly recommended. A mobile equipment tower would ensure better, faster, safer and more efficient use of equipment. Therefore, it is currently analysed if the remaining amount of funding can/may be invested in a LS tower.

Collaboration in 2024

The collaboration with the surgeons of Mutolere hospital, progressed well.

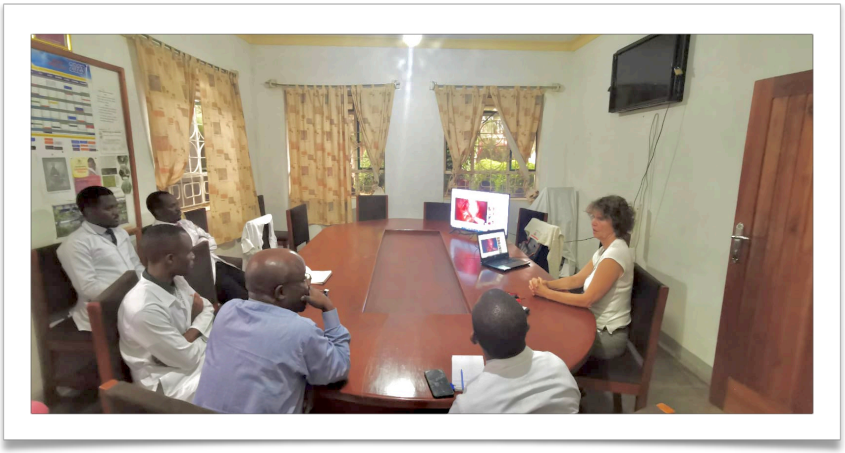
The dedicated, well-trained surgical team and the willingness to learn, provides a good setting for knowledge and skill exchange. **The program of 2023 was continued**:

A weekly presentation

Topics; 1. Laparoscopic Surgery revisited 2. A deadly per operative complication: CO2 embolus 3. Trouble shooting and lessons learnt until now 4. What's new and how does it work 5. How and when to convert.

Aim: Background knowledge on surgical strategy, team effort, anesthesia related care, surgical effects on morbidity and awareness of healthcare gain of diagnostic and interventional laparoscopy.

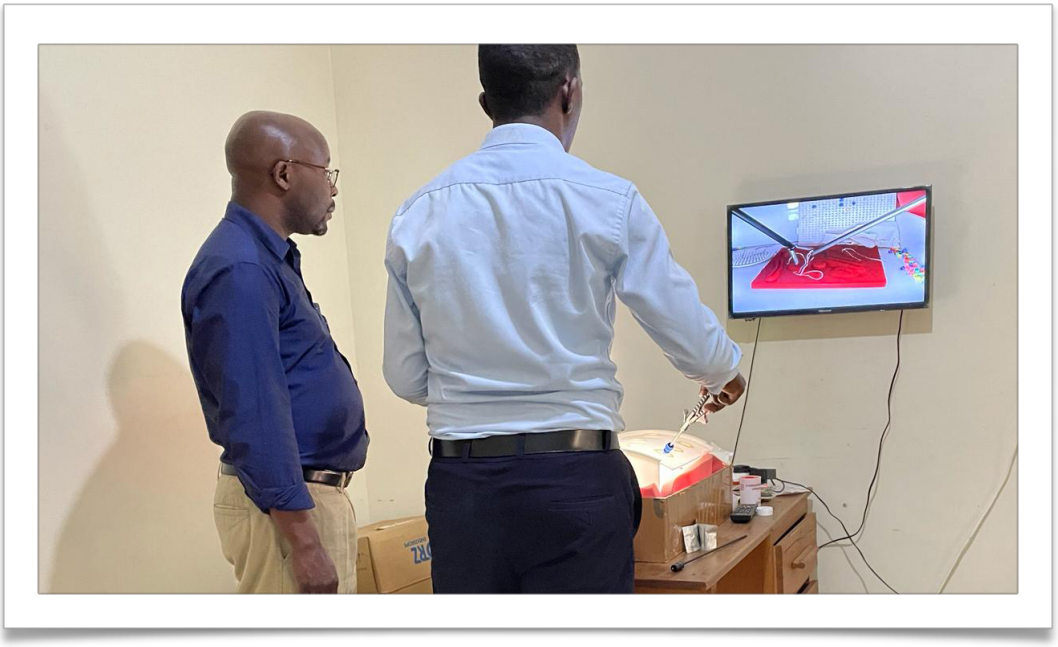
Participants: Surgeon, Gynecologist, Anesthesiologists, medical doctors and OR nurses.



Endotrainer:

Training and teaching of instrument handling and suture techniques. Competition was introduced.

Aim: Brain-eye coordination, 2-dimensional feel of 3-dimensional procedure, instrument handling and intra- en extra-corporal knotting



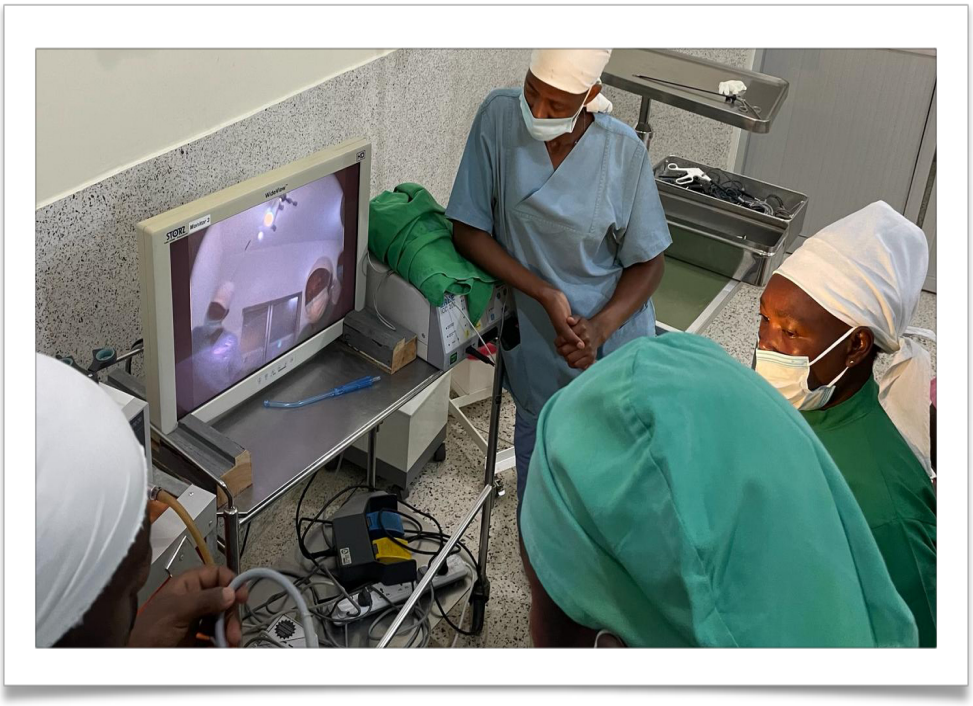
Participants: Gynecologist, Surgeon and surgical resident.

- **Bedside teaching**: Triage of suitable patients and post -operative care with focus on early mobilization, reduced pain medication and early discharge. *Aim*: Practice "Early warning signs" (EWS) for triage of septic patient 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.

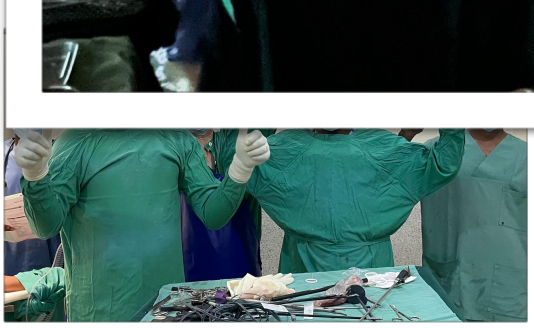
- **Training on the Box for the whole OR team.** Training was given by surgeon Dr. Bosco in collaboration with S. Donkervoort. The whole team was instructed on the equipment use, tasks during the procedure, instruments and the use of the camera. To enlighten everybody on how laparoscopic surgery works the team were at the end of the workshop invited to do a

surgical procedure on the box together. The whole setting and the steps needed to undertake a surgical procedure was simulated.



- **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 surgeon, anesthetist, OR-assistants and the medical doctor from the Netherlands. Supported by Gynecologist as trainer and supervisor of OR assistants.

A variety of surgical and gynecologic procedures were performed. Collaboration between the two disciplines grew. It contributed to training of skills for all participants and to a successful ending of procedure in both specialization fields. Several procedures, surgical and gynecological were performed successfully at Mutolere hospital for the first time. A successful ending of a new procedure was cheerfully memorated by the whole team.



What was new?

1. **Workshop:** on how to recognize a serious illness in a patient. Introduction and training in usage of Early Warning Score. Participants: learning nurses, nurses, medical doctors and specialist**.**
2. **OR team training on de box:** to familiarize the whole team with the equipment preparation, usage and cleaning. Knowledge on the equipment and skills in usage helps OR time being reduced and gives the platform for more procedures.

Prediagnosis	Procedure	Gain
1. Accute appendicitus	NSAP	No laparotomy
2. Painfull Hernia post injury	No intra-abdominal pathology	Incision 3-4 RUA,no laparotomy
3. Acute abdomen,mass RA	Localised infiltrated Pathology	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 iatrogenis lesions smal intestine.
6. Abdominal abces, CA? 1,5 years after surgery.	Brown abces subphrenic, . no C.A	Laparosopic drainage
7. Appendicular infiltrate with abces	Abces appendix	Lap App, no laparotomy
8. Suspected Hirsprung in 4 year old	Some signs, biopsies taken	Biopsies, no laparotomy

Prediagnosis	Procedure	Gain
1. Chronic appendicitus	Lap Appendectomy	No laparotomy
2. Jejunal tumor	Diagnosostic laparoscopy	Incision 3-4 RUA, NL
3. Hydrosalpinx	Laparoscopic aspiration	No pfannenstiel
4. Adhesions and ovarialcyst	Adhesiolysis and ovariectomy	No laparotomy
5. Sympt galbladder stones	Lap. cholecystectomy	No subcostal incision
6. Stomach perforation	Lap. hemicolectomy for cancer	No laparotomy
7. Ovariencyst (dermoid)	Lap. ovariectomy	No pfannenstiel
9. Appendicitis	Lap. appendical infiltrate +	No laparotomy
10. Appendicitis	Abces	No laparotomy
11. Cholecysitis	Lap. necrotectomie and abces	No subcostal incision
12/13. Infertility (2x)	Drainage	No pfannenstiel
14. Intestinal obstruction	Diagnostic procedure; livercirrhosis	Small transverse incision
15. Intestinal obstruction	Diagnostic procedure	Conversion
16. Obstructive Invagination	Diagnostic: ovariancyst and intestinal distension	Conversion
17. Choledocholithiasis	Severe lymfadenopathy and colon invagination Lap.chol	Subcostal incision for CBD

3. Procedure done in 2023

Procedure done in 202

After the 4th new procedure performed the whole team was treated on a coffee room party.

Conclusion:

The chosen project of Laparoscopic Surgery has been a successful project. With presentation's, training on the Endo-trainer, OR-nurse training on the box, bedside teaching and 17 laparoscopic procedures. An important progression has been made by our Ugandan surgeon and gynecologists in performing a variety of procedures. The procedures performed have become more complex than in 2023 and the high-volume gynecology procedures have been added.

This progress can be attributed to the dedication of all team members, the high skilled Ugandan surgeon and gynecologists and the eagerness to learn.