

Introduction

The burden of non-communicable diseases, including those that require surgery has been recently recognized. According to the Lancet Commission on Global Surgery, surgical conditions account for more deaths each year than HIV, AIDS, TB, and malaria combined. Inguinal hernia is the most common general surgical condition globally. In Africa, hernias often go untreated and become large, painful, disfiguring, and sometimes even deadly

According to our research, one in nine adult men have hernia in need of repair today in Ghana. Inguinal hernia repair is a simple, cost-effective surgery, however the supply of surgeons is limited in Ghana.

Tension-free inguinal hernia repair with mesh is not widely available in West Africa due to cost and limited provider training. We leveraged Ghana's existing surgical task-sharing system to implement a novel training program in inguinal hernia surgery for non-surgeon physicians using low-cost industry mesh.

Methods

- This is a prospective cohort study comparing outcomes after mesh inguinal hernia repair performed by non-surgeon and surgeon graduates of our training program.
- Primary outcome measures are post-operative complications and hernia recurrence. Secondary outcomes include chronic pain and patient quality of life.



Results

- A total of 242 patients were included in the study.
- Two-week follow up rate was 97.9%.
- There were no differences in age, BMI, ASA class, hernia type or size, or inguinal pain score between patients operated on by non-surgeons and surgeons.
- Post-operative complications occurred in 31 patients (26.1%) in the non-surgeon group and in 28 patients (23.7%) in the surgeon group (P=0.55).
- Pain scores and quality of life improved significantly for patients in both groups

Participant Characteristic	Surgeon (N=39)	MO (N=54)	p-value
Age (years)	51 ± 16	51 ± 18	0.921
ASA Classification of 1- no. (%)	33 (84.6)	44 (81.5)	0.693
Body-mass index (kg/m ²)	22.0 ± 3.6	21.9 ± 3.0	0.927
Scrotal hernia – no. (%)	27 (69.2)	31 (57.4)	0.245
Size of scrotal hernia (cm)	18.6 ± 5.3	18.1 ± 6.5	0.740
Inguinal Pain Questionnaire score	4 ± 2	4 ± 2	0.422
Self-assessed health status score	66 ± 14	71 ± 17	0.138

Outcome	Surgeon (N=35)	MO (N=49)	p-value
Any complication - no. (%)	8 (22.9)	15 (30.6)	0.432
Distribution of postoperative complications - no. (%)			
Hematoma	2 (5.7)	3 (6.1)	0.938
Superficial infection	2 (5.7)	7 (14.3)	0.210
Seroma	3 (8.6)	2 (4.1)	0.391
Severe pain	1 (2.9)	2 (3.9)	0.766
Other complication	0	1 (2.0)	0.393
Difference between pre and post-op quality of life measures			
Inguinal Pain score	-2.3 ± 2.0	-2.2 ± 1.8	0.808
Self-assessed health score	19 ± 17	13 ± 20	0.132

Discussion

- Superficial wound infection occurred in 2 (5.7% patients operated on by surgeons and 7(14.3%) in those operated on by MOs.

In the Northern Ghana study the

- Superficial surgical site infection was 3%.
- The over-all complication rates of 22.9 for surgeons and 30.6 for MOs were comparable.
- Haematoma rate was 5.7 in surgeons and 6 in MOs.
- A previous study from Northern Ghana found wound hematoma rate of 7.

- LDPE mosquito net was not feasible for use in our study

- Low-cost commercial mesh (\$11) now available in Ghana

- Results will represent the largest and longest systematic follow up of mesh hernia repair in Africa

- Pending results, further training courses led by the Ghana Hernia Society will include MOs and surgeons

Conclusion

- Training of non-surgeons in mesh inguinal hernia repair is feasible and safe.
- Long-term follow-up of hernia recurrence is ongoing.
- As a next step, we plan to scale the training program to first-level hospitals across Ghana

Future Directions

- Comprehensive public health plan to increase access to mesh repair
- Advocacy for the addition of funds to cover mesh repair by the Ghana's National Health Insurance
- Evaluation of outcomes after mesh repair performed by non-physician clinicians
- Investigation of outcomes after mesh repair for strangulated hernias

References

Beard JH, Ohene-Yeboah M et al A method to estimate inguinal hernia epidemiology in Ghana. *WJS* 2014.

Choo S et al. Surgical training and experience of Medical Officers in Ghana's district hospitals. *Academic Medicine* 2011.

Darokar A et al. Study of open inguinal hernia repair by mosquito net mesh versus polypropylene mesh *Int J Res in Med Sci* 2015;

Löfgren J et al. A Randomized Trial of Low-Cost Mesh in Groin Hernia Repair *NEJM* 2016.

Ohene-Yeboah M, Beard JH et al. Prevalence of inguinal hernia in adult men in the Ashanti Region, Ghana *WJS* 2016.

Sanders D et al. Mosquito net mesh for abdominal wall hernioplasty: a comparison of material characteristics of commercial prosthetics *WJS* 2013.

Tongaonkar R et al. Ten-year personal experience of using LDPE mesh for inguinal hernia repair *Trop Med & Surg* 2013;

Wagner JP et al. Global Outreach Using a Systematic, Competency Based Training Paradigm for Inguinal Hernioplasty. *JAMA Surg* 2016

Yenli E.M.T, Abanga J., Tabiri S., Kpangkpang S., et al. *Ghana Med J* 2017; 51(2): 78-82

Major Surgical Procedures Performed at 10 District Hospitals in Ghana

Caesarean Section	46.7%
Inguinal Herniorrhaphy	24.4%
Uterine Evacuation	11.1%
Abdominal Hysterectomy	4.1%
Salpingectomy (e.g. for ectopic pregnancy)	2.7%
Hand Surgery	2.4%
Arthrotomy	2.4%
Laparotomy for other abdominal conditions	2.0%
Amputations	1.3%
Open Reduction and Internal Fixation of fractures (ORIF)	1.2%
Other uterine procedures (e.g. myomectomy)	1.0%
Appendectomy	0.7%