

## Inguinal Hernia Repair is Safe in Africa

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**Background:** *Inguinal hernias are a major problem in the developing world. Many patients do not have access to safe elective surgery. They therefore present with the complications of hernia. Those who do have access to elective surgery mostly have non-mesh repairs because of lack of knowledge of Lichtenstein repair, cost of mesh and fear of placing a foreign body in an African setting. This exposes the patient to a high recurrence rate due to the fact that mesh has not been used.*

**Methods:** *Operation hernia is a charitable organization that has been working in Africa since 2005. We have analyzed patients operated on between 2005 until December 2010 in Ghana, Nigeria and the Ivory Coast. Hernias have been operated on electively in a variety of setting, ranging from well-equipped hernia centre to more rural clinics with a makeshift operating room.*

**Results:** *A total of 1748 patients with inguinal hernias have been repaired in Africa using mesh as part of the work done by Operation Hernia. In all, 52.3% were performed using local anaesthetic only. The complication rate was less than 1%.*

**Recommendations:** *We recommend that it is safe to use mesh in Africa provided the level of sterility during the procedure is high and the surgeon has adequate experience of the procedure.*

**Key words:** Hernia. Inguinal, Repair, Safety, Africa

### Introduction

Inguinal hernias are common throughout the world but particularly in Africa. It has been estimated that in Africa there is an incidence of 175 inguinal hernias per 100,000 people each year, but that only 25 are actually repaired<sup>1</sup>. There has been difficulty accessing elective surgery and a large number of patients present emergently with obstruction and/or perforation. This has led to a disproportionately large number of giant hernias compared with the developed world<sup>2</sup>.

It is estimated that 30 patients per 100,000 need surgery for strangulated hernia, but only four actually receive an operation. The mortality rate of patients who have a strangulated hernia and do not reach a hospital has been estimated at over 85%. Even for those who reach a hospital, the majority has had strangulation lasting longer than 72 hours and the overall mortality rate is 40%<sup>3</sup>. ElRashied et al assessed 64 patients with strangulated hernia in Sudan and found that more than half presented to hospital greater than 24 hours after the onset of symptoms. They subsequently had a 37.5% rate of bowel resection and a 6.25% chance of mortality<sup>4</sup>.

Mbah et al<sup>5</sup> looked at 227 patients in Nigeria and found that 20.6% of hernias present as an acute abdominal emergency and they recommended prophylactic repair. Naaeder<sup>6</sup> in Ghana found that of 552 patients presenting with intestinal obstruction, 59.8% were caused by hernias. These patients had an overall mortality of 9.4%.

For those patients fortunate enough to undergo elective inguinal hernia repair in Africa the rate of complications has classically been high. A recent review from Dakar, Senegal on 100 uncomplicated adult groin hernias treated with non-mesh repairs reported a 21% complication rate, including bladder injury; urinary retention; scrotal haematoma; intestinal occlusion and immediate recurrence<sup>7</sup>. Ibingira et al<sup>8</sup> reviewed 86 patients who presented with complications of inguinal hernia repair. The group found that 42% of patients had recurrent hernias. The remaining complications were mainly simple but a proportion had major complications of urine/faecal fistulae or intestinal obstruction.

Mesh repair according to the technique described by Lichtenstein has proven to be effective with decreased risk of recurrence<sup>9,10</sup>. Mesh repair has not been used frequently in Africa due to the lack of

training in the procedure; the expense of the mesh and fear that using a mesh will increase the already high rate of complications. Galukande<sup>11</sup> reviewed the surgical output of 8 hospitals in Uganda, Tanzania and Mozambique and found that 65% of general surgical procedures are for hernias and concluded that there is a great unmet need for surgery in Africa. It has been proven that inguinal hernia can be performed cheaply in Africa with a disability-adjusted life year (DALY) costing \$12.88<sup>12</sup>. The number of work years and quality of life are vastly improved after hernia repair.

Operation hernia<sup>13,14</sup> is a humanitarian organization that was set up in association with the European hernia society. It aims to treat and teach inguinal hernia surgery in low and middle income countries. It was initiated in Ghana in 2005 and now operates in 3 other West African countries, with plans for further expansion. Operation Hernia has delivered over 60 missions and has treated over 6000 patients with hernias. More than 300 volunteers have been deployed to 18 different locations in 8 countries, and Operation Hernia now send out about 20 teams each year. We present the data of the inguinal hernia repairs done in Africa by Operation Hernia.

## Patients and Methods

We have analysed patients operated on between 2005 until December 2010 in Ghana, Nigeria and the Ivory Coast. Hernias have been operated on electively in a variety of setting, ranging from well-equipped hernia centre to more rural clinics with a makeshift operating room.

We included all patients that were operated on by Operation Hernia for inguinal hernia in which mesh was used. We have excluded under 18 year olds, in which we did not place mesh; and those with strangulated hernias, because the risk of complications is different and often mesh can not be used. We excluded patients with femoral hernia, and non-inguinal hernias. There were a number of missions that did not collect data and we have therefore not included them here. Antibiotics were given according to the preference of the operating surgeon, with most being given antibiotic prophylaxis. A rigorous attention to operating room sterility was applied at all times.

The mesh that was used was either one of several standard brand polypropylene mesh or sterilized mosquito net. In this paper we only present those in which we have used brand mesh and we will subsequently report those who were implanted with mosquito net mesh. Hernias have been operated on by a combination of UK and European consultants and senior surgical trainees, with either national or European scrub staff. Local surgeons and surgical trainees were trained in the hernia repair technique described by Lichtenstein, and operated under the supervision of a surgeon from the UK or Europe. There was no routine follow up arranged. Patients were told to return to the centre in which they had their operation if they developed any complications. The patients were counseled on the nature of potential complications. We have only included major complications requiring further operative intervention.

## Results

From 2005-2010 1748 patients were operated on for inguinal hernia using mesh. Patients were operated in 8 centres in 3 countries, sterile operating techniques were used, with a mixture of reusable sterilized drapes and disposable equipment. A combination of mosquito net meshes and standard mesh was used, but here we present only the patients in which a conventional mesh was used. The percentage of men was 82.6%, women 17.4%. Hernias were on the right in 47.0%, the left in 36.9% and bilateral in 16.1%. 52.3% had hernias fixed under local anaesthetic with 35.3% performed under spinal anaesthesia and 12.4% under general anaesthesia.

There were 2 deaths amongst our patients. Both were due to complications of anaesthesia and occurred in the peri-operative period. The complications reported were 4 haematomas that required surgical drainage; 3 seromas that required surgical drainage; 2 mesh infections that required subsequent removal of mesh and one patient who developed an enterocutaneous fistula (Table 1).

**Table 1.** Complications of Elective Hernia Surgery

Type of complication	Number
Large haematoma	4
Seroma	3
Mesh infection	2
Enterocutaneous fistula	1
<b>Total</b>	<b>10/1748 (0.6%)</b>

## Discussion

Operation hernia has been able to successfully treat nearly 2000 patients with inguinal hernia using mesh. These are patients who are otherwise unlikely to have had access to an elective repair of their hernia. We have been able to provide a safe treatment of hernia despite the limited resources. Due to the lack of resources for elective surgery, hernia repair in Africa is often done for strangulation or perforation. Patients present late, and often have a high rate of mortality. Repairing hernias electively is critical for preventing devastating complications.

Despite the large size of many of the chronic hernias, over 50% were able to be repaired under a local anaesthetic only technique. We found that this was very well tolerated by the patients and the operating surgeons. We endeavored to repair all unilateral reducible hernias under local anaesthetic regardless of size. Having a repair performed under local anaesthetic decreases the risks of other types of anaesthesia. This is particularly important in settings where patients are often unaware of medical problems and general anaesthesia is performed by non-specialists. Local anaesthetic techniques also allow for day case surgery and make the procedure cheaper to undertake.

The rate of serious complications within our patients was very low. It may be that patients with complications did not return to the clinics for medical advice; however we assume that it is unlikely that we have not accounted for a significant number of serious complications. The lack of follow up is a problem faced in most parts of Africa.

Inguinal hernia repair has been proven to be cost effective<sup>12</sup> but we now look at sustainable ways of continuing and increasing our program. Part of the Operation Hernia vision involves teaching the Lichtenstein technique to African surgeons and trainees. This will enable many more patients to have access to optimum surgery. Brand mesh is expensive and remains prohibitively so in many situations in Africa. We have therefore started using mosquito net as we feel that this provides a safe and inexpensive mesh.<sup>15</sup> We have recently started a randomized controlled trial of brand versus mosquito mesh that we hope will confirm our initial positive safety findings. This will hugely widen the ability to perform Lichtenstein technique in a resource poor setting.

Despite the Lichtenstein technique being safe, when placing a permanent foreign body the need for utmost adherence to good standards of sterility is paramount. It may not be appropriate to place a mesh in all settings where operating theatre sterility is not adequate. It is usually not appropriate to place mesh in cases of strangulation and incarceration, as the risk of mesh infection is much higher.

There is very little data published from Africa and the majority of studies focus on the poor outcomes after surgery. We feel that our experience of inguinal hernia repair using mesh in Africa has been excellent. The procedure is safe provided the level of sterility during the procedure is high and the



surgeon has adequate experience. We can therefore recommend the routine use of mesh in elective inguinal hernia repair in Africa.

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