

## THE USE OF POLYPROPYLENE-MESH, PRE-PERITONEALLY FOR INCISIONAL HERNIA REPAIR IN NORTHERN GHANA

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### ABSTRACT

The use of alloplastic-mesh is now a common practice in hernia repair around the world especially in the developed and industrialized countries [4]. However in developing countries like Ghana, this methodology is either unknown by many local surgeons and general practitioners, or for fear of the unknown, it is not practiced. This study aimed to assess the appropriateness, outcomes and suitability of polypropylene-mesh (Prolene, Ethicon, Belgium) for large incisional hernia and recurrent incisional hernia repair in Northern Ghana as a “Tension-free” operation procedure. All patients undergoing incisional hernia repair of the anterior abdominal wall defects measuring greater than or equal to 5cm in diameter or any recurrent incisional hernia case from January 2010 to December 2013 were eligible for the study. The “Sublay-technique” was adopted for the use of polypropylene-mesh implantation procedure. A total of 270 patients underwent the polypropylene-mesh, “Tension-free”, abdominal wall hernia repair in Tania specialist hospital. The two main indications for the previous laparotomies, prior to the incisional hernia repair in Tania specialist hospital, were median incision for caesarean sections and laparotomy for typhoid intestinal perforations. Patients’ age ranged from 14 to 70 years. All cases were done under spinal anaesthesia. Post-operatively, one patient (0,37%) had superficial wound infection, six patients (2,22%) had seroma formation and three patients (1,11%) had haematoma formation. No patient developed fistula, net dislocation, strangulation, or recurrent hernia in the immediate post-operative six months period. The study recorded no death.

**Conclusion:** Polypropylene-mesh for large incisional hernia and recurrent incisional hernia repair, is effective, safe and suitable in Ghana, just as it is good for the developed countries.

**Keywords:** Incisional Hernia, Polypropylene-mesh, Tension-free, Hernia Repair.

### INTRODUCTION

Incisional hernia is a type of hernia caused by an incompletely-healed surgical wound. It is usually due to a weakness in the musculo-fascial layer of the abdomen allowing the contents of the abdomen to protrude through the muscle layer. Median incisions in the abdomen are frequently used for abdominal exploratory surgery globally. In Ghana, median incisions are employed for both surgical and gynaecological indications for operational interventions especially under emergency situations or under inexperienced hands. Anterior incisional hernias get their name from their location. These incisional hernias are usually caused by a previous surgical wound; other causes include trauma and congenital problems. Incisional hernias most often develop due to weakness of the surgical wound, which may be due to haematoma, seroma or infection, and all of these result in poor wound healing; it may also be caused by an increased intra-abdominal pressure due to chronic cough (Chronic obstructive pulmonary disease), constipation, obesity, multiple surgeries, urinary obstruction (Prostate carcinoma or Benign prostatic hypertrophy), pregnancy or ascites. They may also occur due to poor surgical techniques, malnutrition and anaemia.

Usually incisional hernia presents as a protrusion at or near the area of a surgical incision, among other signs and symptoms. Any prior abdominal operation can theoretically develop into an incisional hernia at the scar area. However abdominal incisional hernia turn to occur more frequently along a straight line from the xiphoid process of the sternum to the pubic symphysis (linea alba).Hernias in this area have a high rate of recurrence if repaired via a simple suture technique under tension. For this reason it is advised, the repair be done under "Tension-free" repair method using a synthetic mesh.

Hernia repair remains the oldest and commonest surgical procedure performed by general surgeons all over the world [1, 2]. In Ghana, it is common knowledge, that hernias are repaired daily in almost all public and private hospitals in Ghana, accredited by the Ghana health service and the Ministry of Health [2, 32, 34]. Restoring the anatomical structure and the physiological function of the hernia site(s) is very critical for the patient to return to normal life. Post-hernia repair complications include hernia recurrence. Hernia recurrence is a big challenge for both the patient and the surgeon [5]. Hernia recurrence will inflict high physical, social, psychological and financial burden on the patient, family, friends, loved ones and society at large [6].

Incisional hernia repair with tension, risk breaking down and the development of a recurrent hernia. Several incisional hernia repair procedures exist. But it is recommended that "tension free" methods are the most appropriate, (laparoscopic with mesh procedure is better than open method with mesh [26, 27] ).The use of mesh is associated with a lower rate of recurrence[16, 17].From the 1950's to date, alloplastic-mesh has been used to repair various hernia conditions around the world with documented important advantages. These include, tension-free apposition of tissues and supply of a mesh-layer to strengthen the abdominal wall. This idea of tension-free hernia repair was first proposed by Lichtenstein and Schulman[18], to ensure promising results of hernia repair in the long term. To the best of our knowledge, no documentation exists in Ghana on the use of polypropylene mesh for incisional hernia. Hence the aim of this study was to high-light the methodology in the use of polypropylene-mesh pre-peritoneally, its appropriateness and the outcomes in incisional hernia of the anterior abdominal wall seen at Tania specialist hospital, Tamale, Ghana.

Tania Specialist Hospital is a private medical facility approved by the private hospitals and maternity homes board (PHMH) of the Ministry of Health to provide healthcare services including surgical operations. The institution has also been accredited by the Ghana national health insurance authority (NHIA) for the provision of health care services to their beneficiaries and the general public [36, 37]. The two main indications for the previous laparotomies, prior to the incisional hernia repair in Tania specialist hospital, were median incision for caesarean sections and then laparotomy for typhoid intestinal perforations. Patients' age ranged from 14 to 70 years. All cases were done under spinal anesthesia. Within the first week post-operation, one patient (0,37%) had superficial wound infection, six patients (2,22%) had seroma formation and three patients (1,11%) had haematoma formation. No patient developed fistula, net-dislocation, strangulation, recurrent hernia or died after six(6) months in the immediate post-operatively period. Cost per operation was not factored-in in this study.

## Methods

All patients undergoing incisional hernia repair of the anterior abdominal wall defect measuring greater than or equal to 5cm in diameter or any recurrent incisional hernia case

from 2010 to 2013 were eligible for the study following patient's informed consent. Pre-operatively, 2gm intravenous ceftriaxone was given to each patient just before the skin incision was made. A polypropylene-mesh was implanted using: "Sublay-technique", that is, putting the mesh between the peritoneum (inner layer) and the musculo-fascial layer (outer layer), with 5cm extension of the mesh around the wound circumference. The mesh was then fixed onto the musculo-fascial layer with single suture vicryl-0. The wound was lavaged with diluted povidone solution, then Ringer's lactate solution and two (2) sterile drainage tubes inserted.

The abdominal wall tissues were apposed in a "Tension-free" state in all cases and the fascial layer closed with PDS-2 or Vicryl-2 suture. Subcutaneous tissue was closed with chromic-0 suture and the skin with Nylon-1 suture. The post-operative follow-up schedule were 7/7, 1/12, 3/12 and 6/12. Also no stress was to be exerted on the abdominal wall muscles with or without an abdominal corset for six (6) weeks in the immediate postoperative period.

## Results

A total of 270 patients underwent polypropylene-mesh, "Tension free", abdominal wall incisional hernia repair in Tania specialist hospital, Tamale, Ghana, between January 2010 and December 2013. Patients' age ranged from 14 to 70 years. All cases were done under spinal anesthesia. Within the first week post-operation, one patient (0,37%) had superficial wound infection, six patients (2,22%) had seroma formation and three patients (1,11%) had haematoma formation. No patient developed fistula, net-dislocation, strangulation, recurrent hernia or died after six (6) months in the immediate post-operatively period. Cost per operation was not factored-in in this study.

## DISCUSSION

Hernia repair is one of the most commonly performed operations worldwide and Ghana in particular [2, 4, 28]. Daily, locally trained surgeons and general practitioners perform the procedure routinely, in many health institutions across the country [3, 4]. Over 50% of all hernia cases reported to health care institutions may be untreated in African countries, due to lack of adequate or affordable surgical care [4, 29, 30, 31]. In Ghana trained surgeons, gynaecologists and general practitioners perform surgical and gynaecological procedures including caesarean sections, ectopic operations and laparotomy for typhoid intestinal perforations, appendectomy, acute abdomen among other indications and operations [32].

Since the introduction of alloplastic-mesh or commercial hernia mesh over 50 years ago, the developed countries have standardized their usage, enabling a "Tension-free" repair of hernias [4]. Advantages associated with this procedure include shorter hospital stay, earlier return to work, productivity increase, less incidence or recurrence of hernias [16, 17]. However, in developing countries like Ghana where surgery is considered to be a low public health priority, this resource remains underutilized [2, 3, 4, 14], due to the mesh being alleged to be costly and not affordable or unavailable or the surgeons don't know or have never used polypropylene-mesh for any hernia repair. Today, the most frequently used meshes are those made of polypropylene (Prolene, Ethicon, Belgium), Dacron and PTFE

The lack of adequate numbers of gynaecologists, general practitioners or surgeons in Northern Ghana for decades to manage the health institutions and also the late hospital reporting attitude, among others by patients has created a lot of post-operative complications following surgery, including the abdominal wall incisional hernia [2, 22, 33]. Most surgical operations in Northern Ghana particularly at the teaching, regional and district levels are done

under emergency situations [22], with high bowel resection rates [33, 34]. The low patronage of family planning services coupled with other traditional and cultural practices, religious beliefs, create a fertile ground for high birth rate in Northern Ghana. Teenage pregnancy is also very high, especially among the Northern “Zongo” communities, with the attendant CPD (cephalo-pelvic-disproportion) labour cases and caesarean sections [35].

In a recent experimental study in Goats, [4], proved that the strength and extent of inflammatory response was found to be superior in the polypropylene-mesh with excellent wound healing. Polypropylene-mesh (Prolene, Ethicon, Belgium) or Mersilene or Dacron has been used for many years as a safe and effective vascular prosthesis with low risks of rejection [29]. This was similar to our study as rejection rate was zero. In addition it has been reported as an effective material for the repair of inguinal and abdominal wall incisional hernias, with low rates of recurrence [23, 29]. That also concurs with our findings, as we recorded no deaths, no recurrence after six(6) months. The polypropylene-mesh can be said to be safe and effective as we had a total of ten(10) cases{3.70%} out of 270 cases, with minor postoperation complications. These were six(6) patients{2.22%} who developed seroma, three(3) patients{1.11%} had haematoma and one(1) patient{0.37%} developed superficial wound infection. All these were rectified quickly before patients were discharged. We employed the use of spinal anaesthesia for all our cases. This was similar to other publications, that many African surgeons prefer general or spinal anaesthesia to perform hernia operations, even in elective cases [14]. Also [4] reported that 48% of hernia operations were done under spinal anaesthesia in Northern Ghana. The commonly reported postoperative hernia repair complications are wound infection, seroma, haematoma, recurrence and net dislocation. [14, 22-24] reported on the incidence of wound infection while [1, 23] reported on seroma and haematoma formation. Our use of intravenous ceftriazone( a broad spectrum cephalosporin) just before the skin incision, the generous wound lavage with diluted povidone solution, Ringer’s lactate solution and the insertion of two (2) large drainage tubes, may account for the low rate of our postoperative complications.

## CONCLUSION

This study, therefore confirms and assures all surgeons and general practitioners in general, in Ghana, that commercial- mesh, particular polypropylene-mesh (Prolene, Ethicon, Belgium), for all “Tension-free” incisional hernia (hernia diameter greater or equal to 5cm or a recurrent one) is effective, safe and good in Ghana, as it is in the industrialized world.

## REFERENCES

- 1) Malik AM, Khan A, Jawaid A, Laghari AA, Talpur KAH: J Ayub; Med. Coll Abbottabad 2009, 21(1):17-20
- 2) Ohene-Yeboah M, Abatanga F, Oppong J, Togbe B, Nimako B, Amoah M, Azorliade R: Hernia 2009, 13(5):529-532
- 3) Nordberg EM, British medical journal (clinical research ed.) 1984, 289(6437):92
- 4) Wilhelm T, Anemana S, Kyamanywa P, Rennie J, Post S, Freudenberg S: Tropical doctor 2006, 36(3)
- 5) Neumayer L, Giobbie-Hurder A, Jonasson O, Fitzgibons Jr R, Dunlop D, Gibbs J, Reda D, Henderson W: New England journal of medicine 2004, 350(18):1819-1827
- 6) Liem MS, Halsema JA, van der Graaf Y, Schrijvers AJ, van Vroonhoven Tj, group Ct: Annals of surgery 1997, 226(6):668-676.
- 7) Ruhl CE, Everhart JE: American journal of Epidemiology 2007, 165 (10):1154-1161

- 8) kulah B, Kulacoglu IH, Oruc MT, PolatDuzgun A, Moran M, Ozmen MM, Coskun F: P; The American journal of surgery 2001,181(2):101-104
- 9)Barth Jr RJ, Burchhard KW, TostesonA, SuttonJr JE, Colacchio TA, Henriques HF, Howard R, Steadman S: surgery 1998,123(2):121-126
- 10) McGillicuddyJE: Achives of surgery 1998,133 (9):974-978
- 11) Karatepe O, Acet E, Altiok M, Adas G: Hippokratia 2010, 14 (2):119
- 12)Kingsnorth A:BMJ: British Medical Journal 2004, 528(7431):59
- 13) Kingnorth A, Bowley D, PorterC: Annal of the royal college of surgeons of England 2003, 85(1):18
- 14) Ohene-Yeboah M, Abatanga F: West African journal of medicine 2011, 30 (2):77-83
- 15) Schoudice EB: Surgical clinics of north America 2003, 83 (5):1163-1187
- 16) Amato B, MolaL, Panico S, Persico G, Rispoli C, Rocco N, Moscheti I: Cochrane Data syst. Rev 2012, 4
- 17) Kulacoglu H: Hippokratia 2011, 15 (3):223
- 18) Lichtenstein I, Shulman A: International surgery 1985, 71 (1): 1-4
- 19) Holzbeimer R: European journal of medical research 2007, 12 (1):1
- 20) GianettaE,Cuneo S, Vitale B, Camerini G, Marini P, Stella M: Annals of surgery 2000,231(1):132
- 21)Kingnorth A, LeBlanc K: The lancet 2003,362(9395):1561-1571
- 22) Adesunkanmi ARK, Badmus TA, Ogundoyin O: Annals of the college of Hong Kong 2004, 8(1):14-21
- 23) AytacB, Iya D, OgbonnaB, Dakum N: East African medical journal 2000, 77 (6)
- 25) Haapaniemi S, Gunnar U, Nordin P, Nilsson E: Annals of surgery 2001, 234 (1):122
- 26)Bingener,J; Buch,L; Richards,M; Michalek,J; Schwesinger,W; Sirinek, K(2007). "long term outcomes in laparoscopic vs open ventral hernia repair"Arch surg. 142.6.562.
- 27)LeBlanc,KA. (2005)" incisional hernia repair: laparoscopic techniques". World journal of surgery 29(8):1073-9
- 28)Aytac B, Cakar K, Karamercan A; Comparison of shouldice and Lichtenstein repair for treatment of primary inguinal hernia. ActachirurgicaBelgica 2004; (4):418-421.
- 29)Yang J, Papandria D, Rhee D, Perry H, Abdullal F; Low-cost mesh for inguinal hernia repair in resource-limited settings. Hernia 2011;15(5):485-489.
- 30)Lavy C, Tindall A, Steinlechner C. MkandawireN, Chimangeni S; surgery in Malawi- a national survey of activity in rural and urban hospitals. Annals of the Royal College of Surgeons of England. 2007; 89(7):722.
- 31)Ozgediz D, Galukande M, Mabweijano J, Kijjambu S, Luboga S; the neglect of the global surgical workforce:experience and evidence from Uganda. World journal of surgery.2008;32 (6):1208-1215.
- 32) Callistus B. Kuubiere, AbassAlhassan, Victor Mogre and Saeed F. Majeed; the epidemiology of hernias in Tamale, Northern Ghana. advances in research 3(3):269-274,2015
- 33)McConkey SJ; case series of acute abdominal surgery in rural Sierra Leone. World of Medicine. 2002; 26 (4):509-513.
- 34)Ohene-Yeboah M, Abantanga F. inguinal hernia disease in Africa: A common but neglected surgical condition. West African journal of Medicine.2011; 30 (2):77-83
- 35) Nordberg EM; incidence and estimated need of caesarean section, inguinal hernia repair, and operation for strangulated hernia in rural Africa. British Medical journal (clinical research ed.) 1984; 289 (6437):92.
- 36) Health MO. National health insurance policy framework for Ghana. In. Edited by Health OM; 2004.
- 37) National health insurance authority ; national health insurance scheme;2003.retrieved from <http://www.nhis.gov.gh/nhia.aspx>.