



Case report

HIV patient with prolonged infection after hemicolectomy and repair of complicated hernia. Mini-review of a rare successful surgical outcome

Mahamudu Ayamba Ali^{a,*}, Israel Hagbevor^b, Raymond Saa-Eru Maalman^a,
Yaw Otchere Donkor^a, Florence Dede^c, Emmanuel Abedi^b

^a Departments of Surgery and Basic Medical Science, School of Medicine, University of Health and Allied Science, Ho, Ghana

^b Surgical unit, Margaret Marquart Catholic Hospital, Kpando, Volta Region, Ghana

^c Department of Surgery, University of Ghana Medical School, Korle-Bu - Accra, Ghana

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ABSTRACT

Introduction and importance: Surgical site infection (SSI) is an inevitable occurrence in bowel perforation with faecal soiled hernia wound(s) especially in retroviral patients. Unfortunately, the increased antibiotics and wound care demands do not prevent delayed healing, increased risk of hernia recurrence, or multiple surgeries to control the infection. The standard open or *endo*-laparoscopic Mesh repairs are either deferred or avoided with alternative tissue-based hernia repairs after bowel surgery. The reported success of open tissue-based repairs remains mixed. Nylon monofilament that have been used in infected wounds was chosen for the patient in anticipation of wound infection.

Case presentation: A 48-year-old man presented with a 7-days complicated hernia at the emergency unit, Margaret Marquart Catholic Hospital. Clinical examination revealed signs of shock, intestinal obstruction, and peritonism, laboratory investigation was remarkable of anaemia, septicaemia, deranged renal function, and positive retroviral test. He had concurrent right hemicolectomy and nylon darn after optimisation. The outcome we evaluated after surgery included postoperative pain, scrotal collection, anastomotic breakdown, postoperative analgesic use, wounds infection, prolonged hospital stays, recurrence, and the need for a second surgery. Though he developed prolonged deep SSI, he has intact hernia repair after 6-years.

Clinical discussion: The postoperative critical clinical events presented in this case were unexpected but might have been precipitated by his retroviral status. Thus, a weight loss of over 13 kg within 2 weeks was highly unusual. Furthermore, the positive retroviral status couple with the perforated caecum and soiled peritoneum was the cause of the surgical site infection.

Conclusion: Nylon darning in a retro-positive patient developing prolonged SSI appeared beneficial. It should be considered in patients with anticipated long period wound infection.

1. Introduction

Complicated Inguinal hernia is a common surgical pathology affecting predominantly males with neglected or long-standing hernia [1]. Some of these men sought surgical intervention due to peritonitis resulting from perforated ischaemic viscus with often limited repair options after resuscitation and bowel surgery [1,2]. At the same time bowel and hernia surgeries, the standard open mesh or *endo*-laparoscopic hernia repairs modalities are often limited by potential

catastrophic infections for which the choice of tissue-based repair is viewed as a better option by most surgeons worldwide [3–6]. Further depression of the natural immunity of Human Immunodeficiency Virus (HIV) infected patients by the major surgery or acquired immune deficiency syndrome (AIDS) predisposes the wounds to prolonged healing. Generally, current literature is rather void of evidence-based guidelines regarding the optimal method of repair in heavily contaminated hernias in patients with HIV infection [5]. The choice of synthetic or biological mesh and the several open-tissue base repairs in the anticipated

Abbreviations: HIV, Human Immunodeficiency Virus; SSI, Surgical Site Infection; AIDS, Acquired Immune Deficiency Syndrome; FBC, Full Blood Count; ASA, American Society of Anaesthesiologist.

* Corresponding author.

E-mail address: aayamba@uhas.edu.gh (M.A. Ali).

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infection remains unclear. As such, deferred hernia repairs after bowel resection and anastomosis for future open mesh or *endo*-laparoscopic procedure, the use of biological or other modified mesh, and tissue-based repairs for same time surgery are all currently in practice [5]. Aside from the economic burden, inconvenience of repeated surgeries and exposure to repeated anaesthetic complications, a good outcome of these repair modalities are not guaranteed in retroviral-positive patients with potential deficient immunity.

We present a case of a retroviral-positive adult male with peritonitis resulting from the caecal perforation in a strangulated right inguino-scrotal hernia. The hernia was managed by herniotomy and nylon darn repair of the posterior wall after resuscitation and right hemicolectomy. He developed prolonged deep incisional surgical site infection with exposure of the repair, scrotal abscess and acute weight loss which was managed by wound dressing, antibiotics, and nutritional supplementation. Six years after discharge he is doing very well with no evidence of hernia recurrence. By presenting this case and a review, we hope additional evidence from our detailed observation of the exposed repair may provide further scientific bases when selecting nylon darn. This, we view as an optimal hernia repair method in a population at the highest risk of infection including HIV/AIDS patients since there is limited treatment option and knowledge.

2. Case presentation

This study is registered with a unique identification: research registry 7358 which is found in the link: <https://www.researchregistry.com/browse-the-registry#home/> [7]. The manuscript was prepared and presented in line with the SCARE reporting criteria by Agha et al. [8].

A 48-year-old peasant crop farmer presented with a 2-day history of generalised abdominal pains, fever and passing scanty urine. This was preceded by a 5-day history of painful irreducible right groin swelling associated with absolute constipation and vomiting. He first noticed the swelling 11 years ago which was reducible with occasional episodes of irreducibility which he usually manipulated to reduce. There was no prior history of lower urinary tract symptoms, chronic cough, chronic constipation, or any co-morbidity.

Physical examination revealed an ill-looking patient, pale, jaundiced, dehydrated, and febrile (temperature of 39.2 degrees Celsius). The respiratory and pulse rates were 25 breaths/min and 108 beats/min respectively with a blood pressure of 98/55 mmHg. The abdomen was globally distended, tense with peritonism, and a less tender irreducible right inguinoscrotal swelling. A diagnosis of septic shock from a complicated right inguinal hernia was made.

Resuscitation: Intravenous fluid (normal saline and dextrose saline), intravenous ciprofloxacin 400 mg, metronidazole 500 mg, intranasal oxygen-4 L/min, adrenaline (1 vial in 500mls normal saline) and transfused 2 pints of blood. Nasogastric tube and urethral catheter passed. He was optimal with the following vitals recording before surgery without intensive care unit admission: Urine output >0.6 ml/kg/hour. SPO₂ -94%, blood pressure, pulse, and respiratory rates were 115/70 mmHg, 86 bpm, and 22 cycles respectively.

Investigation: Full Blood Count (FBC) - haemoglobin 7.4 g/dL, leucocytosis of 21×10^3 with differential neutrophilia of 83%, and decreased platelets level (58×10^3). Blood urea - 11.2 mmol/L, creatinine - 162 μ mol/L. Retroviral tested positive and random blood sugar-6.1 mmol/L. There was no diagnostic investigation. The American Society of Anesthesiology (ASA) score was III. He was counseled for surgery to which he gave informed consent.

3. Surgery

Under general anaesthesia, intubated and cuffed, an extended midline incision was made to enter the abdominal cavity. Findings in the abdominal cavity were free fluid with faecal matter, herbal residue, and

extensive exudate. A gangrenous perforated caecum with matted small bowel. The hernia sac contained redundant large bowel which was guided back into the peritoneal cavity through the oblique groin incision over the swelling. He had right hemicolectomy, herniotomy, nylon darn repair of the posterior wall, and abdominal drain inserted after Peritoneum lavage. The procedure was performed by a urologist in a district hospital.

4. Postoperative care

Post-operatively, he was transfused another pint of blood, continued with the intravenous antibiotics, fluids, and analgesia, 50 mmol intravenous KCL/day in 1.5 L normal saline slowly over 24 hours, intravenous omeprazole 40 mg daily, and maintained nil per oral route. He started graded oral intake after 72 hours and oral medications. However, he took several days to resume full feeds. Intravenous combine vitamins and local formulated high carbohydrate diet were also introduced. He progressively lost weight and by week 4, he had lost 13.2 kg but remained stable.

5. Wound care

The wound was exposed on day 2 postoperatively, cleaned with savlon and normal saline, and dressed with povidone-soaked gauze cover. Both wounds were observed to be discharging serosanguinous fluid and by day 3 it was draining offensive pus with the massive scrotal collection and copious exudate from beneath. The wounds were cleaned twice daily with the savlon and irrigated with normal saline and the cavity was packed with povidone-iodine-soaked gauze. The discharge subsided after 2 weeks, and we reverted to daily dressing. Granulation over the nylon darn sutures started around the 5th week (Fig. 1). He had secondary suturing after the 6th week (Fig. 2). He was discharged after 8 weeks with parts of the abdominal wound healed (Fig. 3). He continued wound dressing at his primary facility with methylated spirit and further investigations and treatment at his chosen Anti-Retroviral Clinic.

6. Discussion

The postoperative critical clinical events presented in this case were unexpected but might have been precipitated by his retroviral status. Thus, a weight loss of over 13 kg within 2 weeks was highly unusual. Furthermore, the positive retroviral status coupled with the perforated caecum and soiled peritoneum was the cause of the surgical site



Fig. 1. Fifth weeks after repair showing gapped wound with nylon darn monofilaments with granulation tissue over the posterior wall repairs.



Fig. 2. Attempted closure of the groin wound exposing the posterior wall repairs at the 6th week of dressing.



Fig. 3. Discharged after 8 weeks with a partially healed abdominal wound.

infection (SSI). The SSI was both an economic and clinical problem as his admission time, antibiotics treatment, dressing requirement was extended.

The major surgery (right hemicolectomy) and his retroviral status predisposed him to prolonged infection. The intraoperative finding indicates that the nylon darn repair withstood the period of infection and beyond by maintaining the repair despite the level of inflammation. The nylon darn repair is a faster method of repair and easy to handle and is therefore crucial in patients with such acute presentation. Furthermore, the larger pores, minimal surgical knots and nontraumatic suturing were helpful in allowing exudation of purulent substances while maintaining a minimal amount of material in the surgical field. This is shown in Fig. 1.

7. Risk

The risk of inguinal hernia among the HIV-infected population is not exactly known. In Sweden, the incidence was reported to be twice that of the general population and increases to 11.3 per 1000 risk of developing anterior abdominal wall hernia among those on antiretroviral treatment [9]. Separation of the rectus abdominis muscle along the linea alba is a reported feature of HIV-associated lipodystrophy syndrome which is linked to the cause of anterior abdominal wall hernias [10]. These together with SSI are a recipe for failure in any repair.

Identification of patients at high risk of SSI during repair remains key to informing surgeons as to the precautions including the type of repair and postoperative treatment to maximise good outcomes.

To these efforts, several factors or perioperative predictors of SSI include advancing patient age, American Society of Anaesthesiologist [ASA] score > 2, diabetes, smoking, emergency surgery, low resource settings, use of general anaesthesia, immunosuppression, concurrent bilateral and sliding hernias repairs were identified [11,12]. SSI is noted to occur in 0.5%–17.4% of patients undergoing even elective inguinal

hernia repairs with prophylactic antibiotics cover [13–17]. The incidence is much higher if patients presented with an emergency, or the surgeries were conducted at low resource settings [1,18,2]. Multiple factors impacted this repair.

The wound infection risk in HIV patients with emergency hernia repairs is not known. The reliance on viral loads and/or CD4 counts at the time of surgery in predicting morbidity and mortality are said to also be inconclusive among cases without the advanced disease [19,20]. Besides, there is less practical daily use of these investigations [19,20]. Horberg and colleagues however found an increased risk of pneumonia, mortality, and overall complications when viral load exceeds 30,000. Infectious complications in these patients are determined by either the pathophysiological stage of the disease or the magnitude of the procedure [19]. Our patient appeared to have suffered the consequences of advanced disease including immunosuppression, malnutrition, and infections.

Hernia repair options in HIV patients:

The standard open mesh or end-laparoscopic intervention is often avoided when an infection is anticipated to prevent the need for mesh removal even though isolated reports have indicated the safe use in dirty and contaminated wounds [5,21–24]. Open mesh repairs have been reported in Amyand hernia after appendicectomy as well as non-traumatic abdominal wall hernia repairs in HIV patients on antiretroviral treatment without post-operation infection [25,26]. Bassini and Shouldice methods are commonly used to repair complicated or hernias with anticipated infections worldwide [27,28]. In sub-Saharan Africa however, the Nylon darn is predominant [29,2,1,18]. The choice of nylon darn repairs was based on our set-up and previous experience in using it for complicated hernias.

The current focus of research to design or improve material used for potential infective fields include prolonged absorption duration, spaces of the individual fibers, improvement of the tensile strength, limited knots, limited density, flexibility, biocompatibility, prevent cutting through sutures, and prevent transmission of bacteria through the material [27,30]. Ideal materials for repairs in these patients should possess a high ability to resist infections and retain its functional strength to such a period that native cellular ingrowth, tissue remodeling, and maturation of collagen is complete to allow a shift of mechanical load. These products must not reduce biocompatibility, cause delayed cellular infiltration and or neovascularization. Modifications such as chemical impregnation, use of poly-4-hydroxybutyrate, and avoiding mesh from porcine or human intestines.

8. Nylon Darn

Nylon Darn as described originally or modified uses a single nylon suture to weave bigger space that appears like the modifications mentioned. It is also bacteria resistant and widely used in other emergency hernia repairs [18,1]. Nylon sutures have been long used in dirty wounds and wounds that require longer tensile strength or permanent apposition. The elasticity of the single 1 or 2 nylon suture appears not affected by changes in wound medium as exposed (Fig. 1). The spaces (pore size) between fibers are maintained. This is key to avoiding bowel entrapment while allowing purulent material to escape to the surface. Single mono-filament suture weaved has only starting and ending knots and minimal intersections with pull-outs that do not create big holes or tear the fasciae for easy bacterial translocation.

9. Conclusion

Infections are inevitable in complicated hernias with perforated caecum in HIV patients. The clinical progression may include prolonged catabolic state and deep SSI which is often unfavourable for optimal wound healing and weak repair. Successful management although depends on a wide variety of factors, of which the method chosen for repair is paramount. Infected nylon darn appeared to maintain its properties

suitable in the repair of complicated hernia in HIV positive patients. We believe nylon darn repair should be widely thought of and selected as the first choice for inguinal hernias with perforated viscus likely to develop prolonged infections in HIV patients.

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Consent

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Research registration

researchregistry7358, <https://www.researchregistry.com/browse-the-registry#home/> (the usefulness of nylon darn posterior wall repairs in prolonged SSI in HIV patient).

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CRedit authorship contribution statement

Mahamudu Ayamba Ali-study concept, design, writing of paper, interpretation, patient care
Israel hagbevor-patient care, data collection
Raymond Saa-Eru Maalman-paper write up, editing, design
Yaw Otchere Donkor- write up, editing, design
Irene Dede- design, editing, interpretation
Emmanuel Abedi-patient care, data collection
All authors contributed per the guidelines for authorship, read and approved the current form of the manuscript.

Declaration of competing interest

All authors declare no conflict of interest

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