

Poly Antimicrobial Resistance as an Unforeseen Challenge in Obstetric Surgery: A Case Report from Bugando Medical Centre, Tanzania

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Abstract

Background: Post-operative wound sepsis by hospital multidrug-resistant strains is a life-threatening phenomenon that poses significant management challenges to medical personnel and often results in increased morbidity and mortality.

Case presentation: We report a case of a 38-year-old African woman, para 5 living 4, referred to our facility from a health centre after sustaining an iatrogenic bilateral ureteric injury while undergoing supracervical hysterectomy following a complicated cesarean delivery. Bilateral ureteric re-implantation was done, and 6 days post-operation, she developed wound dehiscence with foul-smelling pus discharge. Multidrug-resistant *Acinetobacter* spp. and *Pseudomonas aeruginosa* were isolated from pus and urine cultures, respectively.

Conclusion: Healthcare-associated wound sepsis from multidrug-resistant (MDR) pathogens poses severe challenges. Adhering strictly to antibiotic stewardship and infection control measures is crucial, with culture and sensitivity testing essential for appropriate treatment.

Keywords: Antimicrobial resistance, Surgical site infection, Nosocomial infection, *Acinetobacter* species, *Pseudomonas aeruginosa*, Urinary Tract Infection.

Introduction

Antimicrobial resistance is defined as the ability of microorganisms to survive and remain viable despite exposure to antimicrobial agents (1). Post-operative wound sepsis by hospital-

acquired MDR strains are a life-threatening phenomenon that may not only result in morbidity, functional disability and mortality but also pose significant management challenges to medical personnel, resulting in difficult-to-treat or even

untreatable infections with locally available antimicrobials (2).

Case Presentation

A 38-year-old African woman, para 5 living 4, was referred from a health center to Bugando Medical Centre, a tertiary hospital. Presented with post-surgery urinary retention following a supracervical hysterectomy due to uterine atony. Her history included prolonged labor, culminating in an emergency cesarean section, delivering a 3.6kg baby girl with APGAR scores of 8 and 10 at 1 and 5 minutes, respectively. Despite attempts to induce uterine contractions with uterotonics, massage, and B-Lynch sutures, her uterus remained unresponsive, necessitating the hysterectomy. Despite fluid infusion post-surgery, she did not produce urine, prompting the referral 30 minutes post-surgery.

During the physical examination at our Emergency Department, we assessed an adult woman who was intubated and being ventilated with an Ambu bag. Her blood pressure measured 104/77mmHg, pulse rate was 135 cycles/min, and oxygen saturation was at 100%. Upon abdominal examination, a distended abdomen covered with clean, dry gauze was noted, revealing a lower transverse abdominal incision that appeared clean with no discharge. Palpation revealed no palpable enlargement of the liver, spleen, or kidneys. The abdomen produced a tympanic percussion note, and bowel sounds were faintly audible upon auscultation.

Her full blood count revealed: Erythrocyte Count $2.64 \times 10^6/\text{mm}^3$ (Low), Hemoglobin was 5.8 g/dl

(Low), Hematocrit 17.3% (Low), and she was blood group O Rhesus Positive. Her liver enzymes and renal function tests were within normal ranges and an abdominal and pelvic ultrasound revealed bilateral hydronephrosis with minimal free peritoneal fluid.

The immediate decision was made for emergency laparotomy to address suspected bilateral ureteric obstruction. Intraoperatively, minimal hemoperitoneum, normal ovaries, absence of the uterus body, and bilateral hydronephrosis were observed due to ureteric tie near the cervical stump. The tied ureters were identified, dissected, re-implanted, and bilateral ureteric J stents inserted. Peritoneal lavage with warm normal saline (0.9% NaCl) was performed before closing the abdomen in layers. The patient received two units of blood intraoperatively and was admitted to the surgical ICU for post-operative care, including analgesics, intravenous fluids, and empiric antibiotics (IV ceftriaxone 1gm daily and IV metronidazole 400mg every 8 hours for 7 days).

Six days after the surgery, foul-smelling pus was observed discharging from the surgical site, necessitating the removal of sutures to facilitate drainage. This ultimately resulted in fascial wound dehiscence. Culture and susceptibility test of the pus revealed *Acinetobacter spp* isolates resistant to multiple antibiotics including ciprofloxacin, cotrimoxazole, gentamicin, ampicillin, ceftriaxone, meropenem, and cefepime, with sensitivity only to Amikacin and Tigecycline - Figure 1a.

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Twice-daily wound dressing with Normal Saline (0.9%) was started, along with intravenous Amikacin 500mg every 12 hours for two weeks and metronidazole 400mg every 8 hours for five days. After confirming clean and healthy margins, tension sutures were used to close the wound - Image 1a and 1b.

Despite the prescribed medication, the patient experienced intermittent fever during her hospital stay. Tests for malaria and urine culture were conducted, revealing the absence of malaria parasites but the isolation of MDR *Pseudomonas aeruginosa* in the urine - Figure 1b. Due to this, she was treated empirically with polymyxin b which later shows to be sensitive. Although the patient responded well to antibiotics, with the fever subsiding within 48 hours, wound dehiscence reoccurred during treatment - Image 2a. Consequently, a third surgery was performed for secondary closure, successfully achieving closure except for a low-output enterocutaneous fistula – Image 2b. Upon discharge, she had a low-output enterocutaneous fistula - Image 2b. Subsequent clinic follow-ups were uneventful, and the fistula spontaneously closed under conservative management on day 48 post-discharge - Image 3.

Table 1a: Wound discharge culture and sensitivity results showing antibiotic susceptibility and isolated microorganism

Antibiotic susceptibility	ACINE
Ciprofloxacin	R
Cotrimoxazole	R
Amikacin	S
Gentamycine	R
Ampicilin	R
Cefriaxone	R
Pipperacin/Tazobactam	R
Ceftazidim	R
Meropenum	R
Cefepime	R
Amoxyciline/Clavulinic acid	I
Tigecycline	S

ACINE-Acinetobacter species:

(S)usceptible (R)esistance (I)ntermediate.

Culture: PUS

Culture results: Ancinetobacta species pathogen identified.

Table 1b: Urine culture and sensitivity results showing antibiotic susceptibility and isolated microorganism

Antibiotic susceptibility	PSEAE
Ciprofloxacin	R
Amikacin	R
Gentamicin	R
Nitrofurantoin	R
Piperacillin/Tazobactam	R
Ceftazidime	R
Meropenem	R
Cefepime	R

Table 1. Antibiotic susceptibility of urine sample.

Abbreviations: PSEAE – *Pseudomonas aeruginosa*, R – resistant.

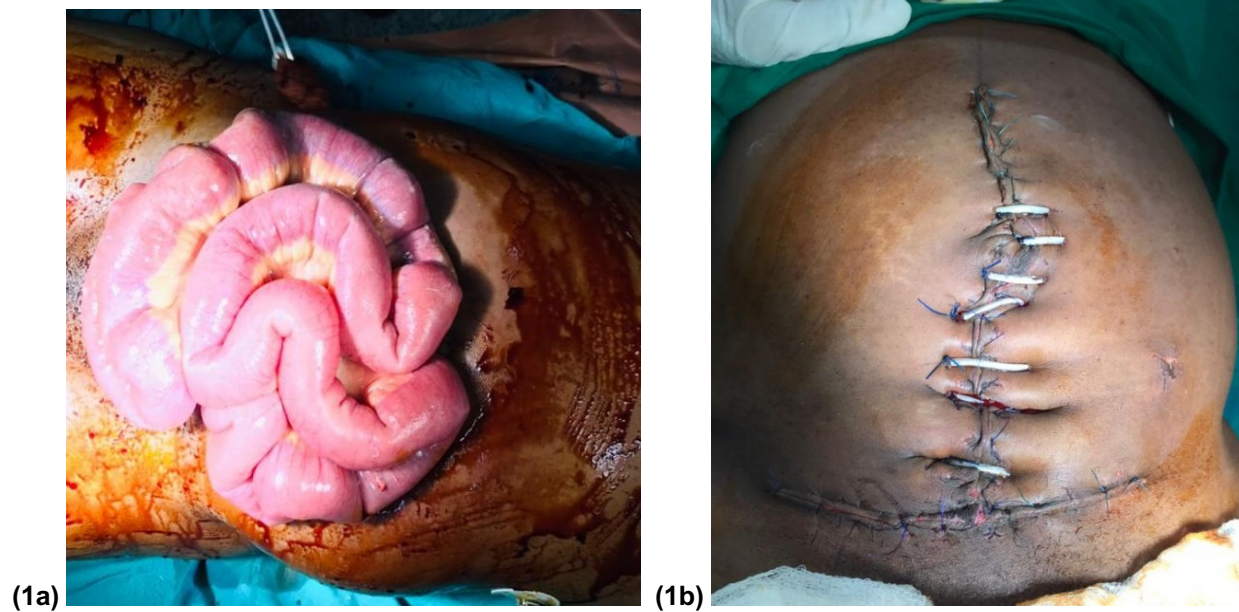


Image. (1a) Wound dehiscence with extrusion of small bowels (1b) Anterior abdominal wall closure with tension sutures.

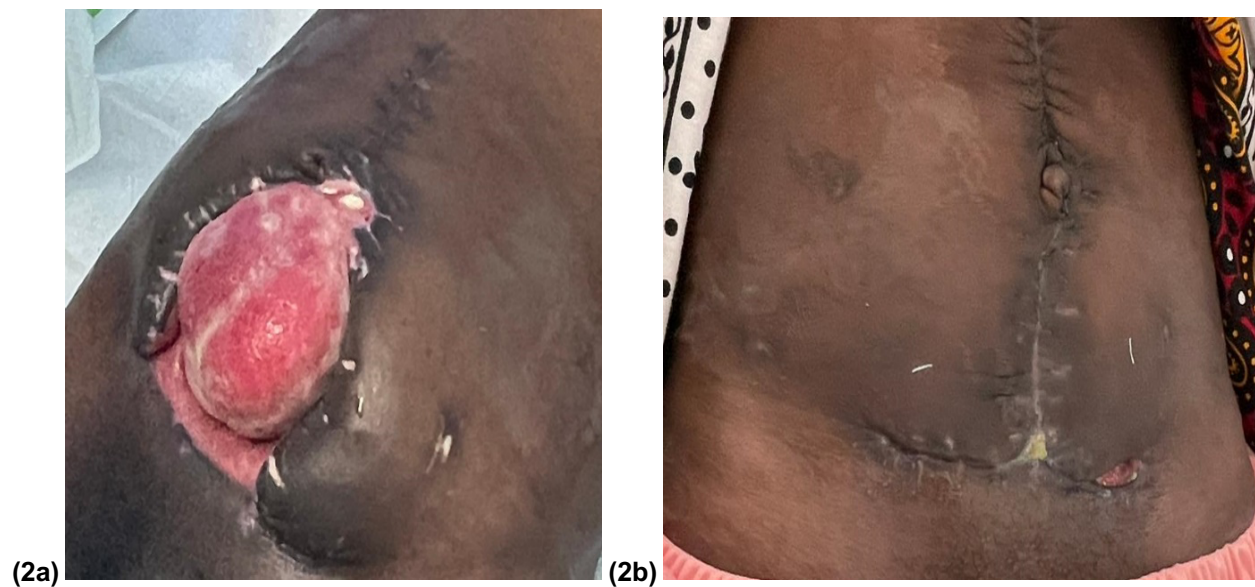


Image 2a. Wound dehiscence before secondary closure (2b) Healed scar with a Low output enterocutaneous fistula

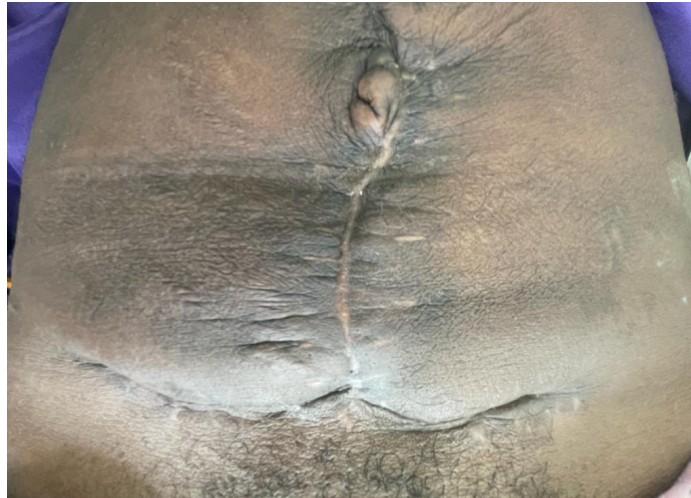


Image 3. Complete healed at 48 days post-discharge

Discussion

Post-operative wound sepsis by hospital-acquired MDR strains is a life-threatening phenomenon that may not only result in morbidity, functional disability and mortality, but also poses significant management challenges to medical personnel (2,3). Post-operative wound sepsis by hospital-acquired multidrug-resistant (MDR) organisms can occur even in a tertiary hospital adhering to infection prevention and control (IPC) standards. In this case, multiple risk factors, including prolonged labor, severe anemia due to excessive bleeding, extended ICU admission, and repeated laparotomies, significantly increased the patient's vulnerability to infection. Consequently, MDR *Acinetobacter* spp. and MDR *Pseudomonas aeruginosa* were isolated from the patient's pus and urine cultures, despite the hospital's adherence to IPC protocols.

Hospital Acquired Infections in African countries ranges from 2.5% to 14.8% twice as high as the average European prevalence⁴ also a study

conducted at Bugando Medical Centre revealed that the prevalence of health care associated infection is 8.6% (5). Several factors have been associated with antimicrobial resistance such as inappropriate antimicrobial uses and poor IPC practices (6,7). Hospital acquired MDR bacteria are the commonest and often transmitted from one patient to another by health care workers (carriers), patients themselves and rarely from environmental inanimate sources (7,8).

Although the source of infection was challenging to ascertain, all the risks increased her susceptibility to acquiring multidrug-resistant (MDR) infections, which can be life-threatening. Pregnant women can harbor multidrug-resistant (MDR) organisms such as MDR *Acinetobacter* spp. and MDR *Pseudomonas aeruginosa*, even without undergoing surgery. These organisms can be present as part of asymptomatic colonization or as the cause of infections in different body sites (e.g., urinary tract infections, respiratory tract infections, or skin infections).

Patients admitted to intensive care units, those who undergo emergency surgeries due to acute surgical conditions and those with underlying diseases have the highest prevalence of occurrence of health care associated infections (9) as observed in our patient.

The most serious Gram-negative infections occur in health care settings and among the most common organisms are *Acinetobacter* and *Pseudomonas aeruginosa* (10). The fact that *Acinetobacter* affects mainly patients in Intensive care units and *Pseudomonas aeruginosa* is often spread in various wards in a hospital facility further explains why the two microorganisms were isolated from pus and urine samples of our patient after being admitted in critical care units (11,12).

This case underscores the importance of adhering to strict obstetric care protocols in low-resource settings. By promptly recognizing poor labor progression and implementing infection prevention measures, we can minimize morbidity and mortality associated with obstetric challenges such as obstructed labor. Furthermore, ensuring safe surgical practices is essential in reducing adverse outcomes. Stakeholders must prioritize mentorship programs, particularly in Comprehensive Emergency Obstetric and Neonatal Care (CEmONC) facilities, to promote adherence to safe surgical practices and improve maternal and neonatal health outcomes.

Conclusion

Healthcare-associated multidrug-resistant (MDR) infections pose significant challenges, leading to severe morbidity and mortality. Adherence to strict infection prevention measures by healthcare workers is crucial to minimize transmission risks. Culture and sensitivity testing is vital in managing patients with postoperative fever, providing essential guidance for treatment and preventive strategies to curb pathogen spread.

Patient's perspective

The care administered was prompt, accompanied by comprehensive explanations regarding the diagnosis, prognosis, and a clear outline of the follow-up plan.

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Timeline

The patient was admitted on October 15, 2022, and discharged on December 14, 2022, following immediate initiation of surgical intervention. The preparation and execution of the case spanned six months, during which it was presented at clinical meetings in the gynecology and surgical departments.

Author's Contribution

GM, AY, and RK played equal roles in the preparation of this case report. The other co-authors – PS, LW, AK, MM, DM, and EN contributed to the management of the patient and the writing of the case report. All authors read and approved the final manuscript.

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Ethical approval and consent to participate

Written informed consent was obtained from the patient for publication of this case report, and permission with Ref No. BU/36/DRI/011/Vol I was granted by the joint Catholic University of Health and Allied Sciences Directorate of Research and Innovation.

Authorization to publish

Written informed consent was obtained from the patient for publication of this case and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal. Additionally, permission to publish was sought and granted by the Catholic University of Health and Allied Sciences Directorate of Research and Innovation. A copy of the authorization is also available for review by the Editor-in-Chief of this journal.

Competing interests

The authors declare that they have no competing interests.

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