

## Critical appraisal of post-repair nosocomial infection: a trigger for failed repair of urinary fistula

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### Abstract

**Background:** Failed fistula repair is an emotive outcome for surgeons and patients. It is usually characterized by anger, frustration and depression. Postoperative urinary tract infection could cause failed repair. Serial urine samples for microscopy, culture and sensitivity with prompt treatment of infection if it exists will usually prevent this unwanted outcome.

**Objectives:** To describe the pattern of nosocomial infection post-urinary fistula repair among women with failed repair.

**Methods:** This was a retrospective review of medical records of women with failed urinary fistula from January to December 2012. Of the 25 patients repaired during the period, patient who had failed repair due to proven microbiological specimen urinary infection were adjudged nosocomial infection. The routine practice is to ensure preoperative sterile urine. The same surgeon performed all the surgeries.

**Results:** Five patients out of the 25 patients operated during the period had evidence of nosocomial infections. The entire urine samples microscopy and culture tests yielded same organism- *Klebsiella* species; and the sensitivity as well as resistance patterns to antibiotics were the same. We also observed that all women that developed nosocomial infections were nursed on the same ward at the time.

**Conclusion:** Nosocomial infections could negatively influence the outcome of fistula repair. We recommend that attention should be focused beyond the dexterity of the surgeon but also on drivers of post repair nosocomial infections to reduce the occurrence of failed repair. Training of support staff such as nurses in this highly specialized management is imperative including infection control.

**Key words:** Urinary fistula, nosocomial infection, urinary tract infection, urinary infection fistula

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### Résumé

**Contexte :** L'échec de la réparation de la fistule est un résultat sensible pour les chirurgiens et les patients. Il se caractérise généralement par la colère, la frustration et la dépression. Une infection des voies urinaires postopératoire peut entraîner une défaillance de la réparation. Des échantillons d'urine en série destinés à la microscopie, à la culture et à la sensibilité, avec un traitement rapide de l'infection, si elle existe, préviendront généralement ce résultat indésirable .

**Objectifs :** Pour décrire le schéma d'infection nosocomiale après la réparation de la fistule urinaire chez les femmes dont la réparation a échoué.

**Méthodes :** Il s'agissait d'un examen rétrospectif des dossiers médicaux de femmes atteintes d'une fistule urinaire défailante de janvier à décembre 2012. Sur les 25 patientes réparées au cours de la période, les patientes dont la réparation avait été manquée en raison d'un échantillon microbiologique prouvé ont été considérées comme une infection nosocomiale. La pratique courante consiste à s'assurer de l'urine stérile préopératoire. Le même chirurgien a effectué toutes les chirurgies.

**Résultats:** Cinq patients sur les 25 opérés au cours de cette période présentaient des signes d'infections nosocomiales. La microscopie et les tests de culture des échantillons d'urine complets ont révélé le même organisme: l' espèce *Klebsiella* ; et la sensibilité ainsi que les profils de résistance aux antibiotiques étaient les mêmes. Nous avons également observé que toutes les femmes développant des infections nosocomiales étaient soignées dans le même service à l'époque.

**Conclusion:** les infections nosocomiales pourraient influencer négativement sur l'issue de la réparation de la fistule. Nous recommandons que l'attention soit portée au-delà de la dextérité du chirurgien mais également aux conducteurs d'infections nosocomiales post-réparation afin de réduire le risque de défaillance de la réparation. La formation du personnel de soutien tel que les infirmières à cette gestion hautement spécialisée est impérative, y compris la prévention et control des infections.

performed under regional or general anaesthesia where indicated; and post-operative care administered for 10 to 14 days. In our unit, failed repair is defined as leakage of urine before or after

**Table 1:** Socio-demographic characteristics of the participants

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
Age (years)	35	39	23	35	24
Parity	4	2	0	1	1
No of living Children	3	1	0	0	0
Occupation	Trader	Trader	Student	Trader	Patent medicine attendant
Marital Status	Married/ Supportive	Married/ Supportive	Single	Single	Separated

discharge post operatively.

**Table 2:** The clinical features of the participants

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
Type of fistula	Vesicocervical fistula	VVF + Uretero-VF	Urethero-VF + VVF	VVF +RVF	VVF
Antecedent history	Prolonged obstructed labour/ CS	Ruptured uterus/ Hysterectomy	Iatrogenic VVF due to failed vaginoplasty for a Congenital transverse vaginal septum	Prolonged obstructed labour	Prolonged obstructed labour/ CS
Outcome of Pregnancy	Live baby/ Alive & well	Stillborn	-	Stillborn	Live baby/ Early neonatal death
Duration of fistula (years)	3.5	6	5/12	17	10
No. Previous attempt	1	0	2	3	0
Size of fistula (cm)	1 X 2	4 X 6	3	2X2 VVF 2X2 RVF	6 X5
Location of fistula	Vesicocervical	Vaginal vault	Anterior Vaginal wall	Mid-Vaginal	Mid-Vaginal
Duration of Surgery(min)	220	270	120	180	60
UrinalysisLeucocyte; Nitrites.	Negative Negative	Positive Positive	Negative Negative	Positive Positive	Negative Negative
Onset of postoperative leakage(day)	8th days	2nd day	10th day	3rd day	7 <sup>th</sup> day
Perioperative	Ceftriaxone antibiotic	Amoxycillin + clavulanate	Nitrofurantoin	Nitrofurantoin	Amoxycillin + clavulanate

VVF- Vesico-vaginal fistula  
 UVF-Uretero-vaginal fistula  
 RVF-Recto-vaginal fistula  
 CS-Caesarean section

**Mots-clés:** *fistule urinaire, infection nosocomiale, infection des voies urinaires, fistule d'infection urinaire*

### Introduction

Genital tract fistula is a major reproductive and public health concern that is largely preventable [1]. Of all the causes, obstetric fistula is the commonest and it has been described as a true reflection of the quality of maternity services [1]. In addition, it is also characterized by being young, illiterate, married at an early age, poor, rural and associated with poor access to antenatal care.[2] Nigeria accounts for 40% of the global fistula prevalence and about 12,000 new cases occurring each year.[2,3] According to the 2008 DHS report, the national average of obstetric fistula was 0.4% with a geographic variation of 0.5% in the North and 0.3% in the South. [4] Urinary fistula may also occur as a result of iatrogenic urethro-vaginal fistula following surgical repair of genital tract abnormalities such as transverse vaginal septum [5], or pelvic surgery like hysterectomy.

Surgical intervention as a treatment modality is in itself associated with anxiety for many patients. The patient and relations are also apprehensive of the outcome of surgical repair. A failed fistula repair with leakage of urine is characterized by emotional blow, anger, expression of frustration, and sometimes frank manifestation of mental health problems by the patient [6,7]. The failed repair sometimes sets clients against their health care providers leading to a tensed relationship. The feeling of disappointment by both the woman and health-care team is due to the cost implication of a subsequent attempt, poor outcome of repeat surgery and fear of subsequent surgeries amongst others.

Evidence from previous studies showed that successful fistula repair is usually dependent on factors such as site, size and number of the fistula; extent of vaginal tissue scarring, number of previous repair attempt, route and technique of repair, skill of the surgeon; infection and postoperative nursing and medical care [8-10] In general, wound healing is affected by age, tissue blood supply, tissue oxygenation; infection, viability of tissue, steroid therapy, vitamins and micronutrients, diabetes mellitus and smoking.[11,12]

Nosocomial infections are hospital-associated or hospital-acquired infections [13] and the risk of acquiring any of these infections increases with hospitalization. Other risk factors are surgical wound infection, prosthesis, implants, foreign body and use of other hospital devices [13]. The site of a

nosocomial infection depends on the risk factor and type of surgical procedure performed. For example, urinary tract infection could occur in catheterized patients, bacteraemia in intravascular catheter use and pneumonia in ventilated and intubated patients [13]. Urinary tract infection is the second most common nosocomial infection. This usually results from ascending infection following catheterization or following contamination of catheter and urine collection bag [13, 14]. It may be due to ascending infection through the urinary tract or via the urinary drainage system.

Postoperative infection could cause failed repair and serial sampling of the urine for microscopy, culture and sensitivity will lead to early detection and prompt treatment [15] thus preventing failure of a successful repair. Nosocomial infection as a cause of failed repair is sparingly considered and reported. Our initial review of literature revealed that there has not been any proactive intention to analyze all post-repair infection in this direction. This gap is crucial because a failed repair attributable to nosocomial infection is easily avoidable and preventable. This will ultimately improve the quality of care. Furthermore, it could also be an eye opener to ensuring that infection control is taken seriously within the health facility. This case series was undertaken to showcase the significance of nosocomial infection in a tertiary obstetric fistula unit and its implication on outcome of care.

### Methods

This was a retrospective study involving a one year review of all fistula repairs performed in 2012 at the University College Hospital Ibadan. The hospital has been offering fistula repair since her inception in 1957 as part of routine gynaecological consultation. In 2008, the genitourinary medicine and urogynaecology unit (GUU) was fully established with the mandate to offer sub-specialized services including Obstetric Fistula Care with four consultant staffs. Two trained nurses in fistula care also joined the unit to compliment the unit activities.

The unit protocol for obstetric fistula management is as follows. Each patient is seen at the weekly outpatient clinic for initial clinical evaluation (history and examination) and thereafter, she is scheduled for a dye test under conscious sedation at the outpatient theatre. On the week of the surgery, routine investigations – haematocrit, urinalysis, group and cross matching of blood and pipette specimen urine for microscopy, culture and sensitivity are performed. Surgery is mostly

Table 3: Microbiological pattern on Urine Microscopy/Culture/Sensitivity

Variable	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
Preoperative urine m/c/s:	Sterile	Sterile	Sterile	Sterile	Sterile
Postoperative urine m/c/s: day 3	WBC: numerous RBC: 1-2 No growth	WBC: 18-20 RBC: 1-2 No growth	WBC: 28-30 RBC: 6-8 No growth	WBC: numerous RBC: numerous No growth	WBC: numerous RBC: numerous No growth
Postoperative urine m/c/s: day 5	WBC: numerous RBC: numerous Klebsiella Spp	WBC: 3-4 RBC: 2-3 Klebsiella Spp	WBC: numerous RBC: numerous Klebsiella Spp	WBC: numerous RBC: numerous No growth	WBC: numerous RBC: numerous No growth
Postoperative urine m/c/s: day 10	-	-	-	WBC: 8-10 RBC: 25-30 No growth	WBC: 2-4 RBC: numerous No growth
Postoperative urine m/c/s: > 10 days	-	-	-	Catheter tip Gram negative Klebsiella Spp/ E. coli	Catheter tip Gram negative WBC: ++ Klebsiella Spp / E. coli
Sensitivity pattern	Levofloxacin Nitrofurantoin	Levofloxacin	Levofloxacin Nitrofurantoin	Levofloxacin Nitrofurantoin	Levofloxacin, Ofloxacin, Nalixidic acid, Pefloxacin
Resistance pattern	Amikacin, gentamicin, cefuroxime, Cefazidime, Ciprofloxacin,	Amikacin, gentamicin, Cefazidime, ofloxacin, ciprofloxacin, ceftriaxone, amoxicillin/ clavulanate	Amikacin, Gentamicin, Cefazidime, ciprofloxacin, ceftriaxone, ofloxacin, amoxicillin/ clavulanate/	Amikacin, Gentamicin, Ofloxacin,	Nitrofurantoin, Gentamicin, Amoxicillin + clavulanate

E. coli- Escherichia coli.

In 2012, the GUU ward underwent renovation and the unit services were temporarily offered in another ward within the hospital by another set of support staff (nurses and ward assistants). During this period, we reviewed all cases of failed repair out of the 25 women that underwent surgery. Five patients had failed repair that were associated with urinary tract infection (UTI). The medical records of these five patients were further evaluated and the data collected included socio-demographic characteristic, clinical features (type of fistula, size, location; number of previous repair attempt, duration of urine leakage, extent of vaginal scarring, and duration of surgery), and urinalysis with microscopy, culture and sensitivity. In this analysis, UTI was defined as a microbiologically proven urinary tract infection detected from catheter specimen urine sample taken from the third postoperative day or from when urine leakage was detected after repair within the first 10 days of surgery. All the five patients reviewed had sterile preoperative urine microscopy and culture.

## Results

Twenty-five women with urinary fistulae were repaired during the period. Five patients had failed fistula repair secondary to post repair urinary tract infections. They were similar in socio-demographic characteristics. The ages of the patients ranged between 23 – 39 years. All the patients were artisans; two of them were still married and had social support from their spouses. (Table 1)

The type and size of fistula, number of previous attempts, and duration of surgery varied among the patients. The duration of surgery varied from 60 to 270 minutes. Two patients had vesicovaginal fistula with either urethral or ureteric involvement and a third patient had combined fistula. Prolonged obstructed labour was the commonest cause with iatrogenic fistula due to caesarean hysterectomy and failed vaginoplasty were seen in two patients. Two of the five patients delivered live babies following prolonged obstructed labour. The onset of urinary leak ranged from the second to the tenth post-operative day. Two patients with urine analysis positive for leucocytes and nitrites had early onset leakage of urine despite a sterile pre-operative urine microscopy. All the patients had prophylactic peri-operative antibiotic therapy. (Table 2)

All patients had preoperative urine microscopy which was sterile and postoperative urine microscopy done between day 3 and day 10 post-operation yielded growth of *Klebsiella* Species as the major organism in addition to *Escherichia coli*

in two patients. The microbiologic studies among the patients showed the same antibiotic sensitivity and resistance pattern. (Table 3)

## Discussion

This study reviewed a common factor among five patients with failed fistula repair who were admitted into the same gynaecologic ward at the same time. We observed that all the women that had failed repair after remaining dry for variable number of days had microbiological evidence of urinary tract infection. Prior to surgery, these five patients had sterile urine samples, suggesting that there was no evidence of either asymptomatic or symptomatic UTI. Furthermore, the urine samples from the five patients grew the same organism, had similar sensitivity and resistance pattern and the culture suggested nosocomial as a possible source. *Klebsiella* infection is one of the commonest causes of hospital acquired bacterial infection [16].

Although previous studies had focused on other recognized causes of failed fistula repair such as surgical expertise, judgement and appropriateness of technique [17], fistula characteristics (large fistula size, bladder neck lesions, degree of vaginal scarring, reduced vaginal capacity, circumferential fistulae, urethral involvement, previous fistula repair, juxta-urethral fistulae) to determine outcome of care [5,18-21], it may be more important to now focus on other avoidable practices that could potentially mar surgical repair outcome. The presence of urinary tract infection after surgical repair of fistula should be aggressively investigated and promptly treated to avoid the catastrophe of failed repair.

Patients with prolonged catheterization are prone to urinary tract infection and this is why observing universal best practices such as good hydration, antibiotics and observing universal precaution at patient bedside is paramount.[13,22-24] The unit routinely follows strict preoperative, intraoperative and post-operative guidelines to manage patients. We had never experienced such accident and the only suspicion was that the infection coincided with the temporary transfer of post-operative patients to a new ward while the GUU ward was undergoing renovation. The support staffs (nurses and assistants) in this ward had neither recently managed post repair obstetrics fistula patients nor undergone any special training like the trained fistula nurses in the primary ward. However, this mishap led to a multidisciplinary meeting and subsequent crash training for the affected support staffs as an interim measure. Thereafter, none of the

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patient operated before relocating to the GUU ward had any noticeable infection. The principles of post-operative care of urinary fistula patients include high fluid intake, adequate urine output and maintain dry beddings. These components of postoperative care require the commitment of nurses trained in fistula care and support staff.

Leakage of urine began in all patients reviewed after the third day except one after 48 hours suggesting that closure of fistulous defect in the operating room was successful. The leakage was therefore more likely to have occurred following postoperative infection probably from the new location. In addition, we demonstrated evidence of infection with microscopy culture and sensitivity from the laboratory since clinical features would have been masked by routine antibiotic use. Although, it can be argued that prolonged catheterization (usually after 72 hours) is a potential nidus for urinary tract infection. However, we have always used broad-spectrum antibiotics based on our experience and local evidence of sensitivity pattern without any complication. The risk of infection is higher with transurethral than suprapubic catheter due to the risk of ascending infection. [25]

An unpublished data from the laboratory surveillance annual report of the hospital infection control unit [26] for the period January to December 2012 showed an overall infection rate of 2.9% with a total of seventeen different organisms. The predominant organisms isolated then were *Klebsiella* spp 31.0%, *Staphylococcus aureus* 26.8%, *Pseudomonas aeruginosa* 13.4% and *Escherichia coli* 12.2% among others. Of all infections caused by *Klebsiella* spp, majority were surgical wounds followed by urinary tract infections. The most common infection caused by *Escherichia coli* in the surveillance was urinary tract infection. [26] *Escherichia coli* was reported in two of the patients with failed repair.

In conclusion, patients on admission or those undergoing surgical procedures in the hospital are at risk of nosocomial infections. The findings from this study suggest that post-operative nosocomial infections could negatively influence the outcome a fistula repair. Intraoperative closure of fistula defect does not in its entirety guarantee successful outcome, a post-operative nursing and supporting care are equally important to achieve the desired surgical outcome. The unfortunate events and experience presented in this review is to raise the awareness of nosocomial infection as an avoidable cause of failed fistula repair among health care providers. In order to prevent a failed obstetric fistula repair, the fistula

health providers should consider the drivers of post-repair nosocomial infections repair in their health facility.

We advocate regular training of nurses and support staff in highly specialized fistula management including the use of simple but effective strategies such as universal precaution and infection control. Routine hospital infection surveillance and control should be practiced to prevent avoidable disasters after treatment.

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