Major article

Does routine prophylactic oral flucloxacillin reduce the incidence of post-circumcision infections?

Limakatso Lebina MD *, Fatima Laher MD, Hillary Mukudu MD, Thandekile Essien BA, MSW, Kennedy Otwombe BEd, MS, Glenda Gray MD, Neil Martinson MD, MPH
Perinatal HIV Research Unit, University of the Witwatersrand, Soweto, South Africa

* Address correspondence to Limakatso Lebina, MD, Perinatal HIV Research Unit, University of the Witwatersrand, PO Box 114, Diepkloof 1860, Soweto, South Africa.
E-mail address: lebinal@phru.co.za (L. Lebina).

Evidence from ecological, cross-sectional, and case-control studies is supported by 3 randomized controlled trials that demonstrate that medical male circumcision (MMC) provides up to 75% initial protection against HIV transmission and that this protective effect is sustained for at least 5 years.1-3

In response, the World Health Organization recommended the scale-up of MMC as a prevention strategy in countries with high HIV prevalence.5 In South Africa, where an estimated 5.6 million people are infected7 and incidence during the period 2005-2008 for the 15-49 years age group was 1.3/100 person years,8 the government has planned to circumcise 1.6 million men by 2016.9

Modeling estimates that for every 5-15 MMCs performed, 1 HIV infection is averted.10 Because the savings gained through HIV prevention will only be realized in years to come, cost-effective evidence-based approaches to massive circumcision programs are required. The countries with high HIV prevalence in southern and eastern Africa will need to spend US$2 billion between 2011 and 2015 to achieve 80% circumcision coverage (20.34 million circumcisions) and a future saving of US$16.51 billion in averted care costs.11

To optimize safety and success, massive MMC programs should be informed by evidence on safe surgical practices and infection control. Implementation science research can improve the knowledge of nurses and physicians on how to control and prevent infections in massive MMC programs.

The complication of wound infection has been reported variably in circumcision clinical trials; a report from Orange Farm9 found it to be 3.7%. Although in clinical trials routine prophylactic antibiotics were not used,3,12,13 clinical trial environments tend to be well equipped and monitored and may differ from massive implementation programs. It is unknown if prophylactic antibiotics prevent wound-related infections after circumcision, and World Health Organization guidelines do not comment on their use.14

Key Words:
HIV
Medical male circumcision
Wound infections
Infection prevention
MMC program

Background: Cost-effective and safe practices are required for the scale-up of medical male circumcision (MMC), a strategy recommended for biomedical HIV prevention.

Methods: A retrospective medical record review was conducted of post-circumcision wound infection incidence at a massive MMC program in Soweto, South Africa. We compared patients who received routine 250 mg prophylactic flucloxacillin 4 times daily orally for 5 days with those who did not receive prophylaxis. Patients with HIV infection and those with missing prophylaxis data were excluded from the analysis. Collated data included prophylaxis received, age, return for follow-up, and presence and grading of wound infection at follow-up.

Results: In total, 1,291 patients were eligible: 646 flucloxacillin recipients and 645 non-recipients. Median age of flucloxacillin recipients was 24 years (interquartile range 20-29 years) and for non-recipients it was 23 years (interquartile range 16-28 years). Eighty-one percent of flucloxacillin recipients and 87% of non-recipients (P = .0019) returned for follow-up. Wound infection was present in 0.7% (5 of 646) of flucloxacillin recipients and 1.2% (8 of 645) of non-recipients (P = .4). Use of routine prophylactic flucloxacillin did not significantly reduce incidence of post-MMC wound infection (odds ratio, 0.6; 95% confidence interval, 0-1.2).

Conclusions: When compared with no prophylactic flucloxacillin, routine prophylactic flucloxacillin does not significantly reduce the risk of post-MMC wound infection in a massive circumcision program.

Copyright © 2013 by the Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier Inc. All rights reserved.
To obtain information about whether or not routine prophylactic antibiotic use prevents wound-related infections after circumcision, we conducted a retrospective medical records review at a massive MMC program in Soweto, South Africa, which initially used and then stopped routine prophylactic antibiotics.

**METHODS**

**Setting**

In 2010, the Perinatal HIV Research Unit, with funding from US Agency for International Development and the President’s Emergency Plan for AIDS Relief, opened a free-of-charge outpatient MMC clinic called Khula Ndoda (Khula Ndoda means “mature men” in isiZulu) primarily aimed at young men without HIV infection. It is located at Chris Hani Baragwanath Hospital in the periurban township of Soweto, South Africa, which has an estimated population of 3 million residents. The capacity of site varies according to seasonal demand: during summer months capacity is 1,200 circumcisions per month, and during winter extended operational hours and additional staff boost capacity to 1,500.

At the clinic, HIV status is first ascertained either through a result received upon referral or through the clinic’s voluntary HIV counseling and testing service. To avoid unnecessary stigmatization, men with HIV infection who request circumcisions are not turned away and they are also referred appropriately for HIV-related care.

Khula Ndoda performs free MMC only on patients older than the age of 12 years. Depending on demand, the clinic performs between 600 and 1,500 MMCs per month. It is staffed with 2 full-time medical doctors who perform all circumcisions employing the forceps-guided method under aseptic conditions with single-use pre-packs. Six nurses assist the doctors. The doctor surgically removes the foreskin, stops bleeding with diathermy, and places 2 sutures; the assisting nurse places the remaining sutures and a dressing. Trained counselors provide wound care information to all patients, instructing them to remove the dressing after 24 hours and then stopped routine prophylactic antibiotics.

Methods used and then stopped routine prophylactic antibiotics. L. Lebina et al. / American Journal of Infection Control 41 (2013) 897-900

**Study design**

A retrospective review of medical records of men who were circumcised at Khula Ndoda was conducted. We chose to review records from 2 months that had similar comparable volumes. Those who received routine flucloxacillin were from the low volume period (ie, February 2011; n = 674 circumcisions); therefore, we chose a low volume month in the “no routine flucloxacillin” period (ie, September 2011; n = 675 circumcisions). Patients were excluded from analysis if they were infected with HIV, had chronic immunosuppressive conditions, or if antibiotic prophylaxis data was missing on medical records.

The following data were collated: age, HIV status, dates of circumcision and follow-up, and presence and severity of wound infection at follow-up. The severity of postcircumcision wound infection was graded mild if there was only a small erythematous area that did not require any further management; moderate if the erythematous area was large, had delayed healing, and was treated with topical antibiotics; and severe if there was wound disruption, severe local sepsis, and was treated with local and systemic antibiotics. Cases of mild infection were not incorporated in this analysis because mild infection was noted to have been under-reported in previous medical records reviews at this site (personal communication, July 2012, SYMMACS [Systematic Monitoring of Male Circumcisions Scale-up] team in South Africa).

**RESULTS**

In total, 1,349 circumcisions were performed during the 2 months under review. For this analysis, 56 patients were ineligible because they were infected with HIV and 2 patients because their prophylaxis records were missing. There were no patients with immunosuppressive conditions during these months. Therefore, 1,291 patients were eligible.

As illustrated in the Figure 1, 646 men received routine prophylactic flucloxacillin and 645 men did not. In the Table 1, characteristics and outcomes of flucloxacillin recipients and non-recipients are compared. Attendance at follow-up was significantly higher (87% vs 81%; P = .0019) in those who did not receive prophylactic flucloxacillin compared with flucloxacillin recipients. For those who attended, the median time to follow-up was 2 days (interquartile range 2-4 days) in flucloxacillin-recipients and 3 days (interquartile range 2-4 days) in nonrecipients (P = .29).

The overall incidence of wound infection was 11/1,000 (1%). The incidence of infections in flucloxacillin recipients was 7.7/1,000 (0.7%), whereas it was 12.4/1,000 (1.2%) in the no prophylaxis group. The odds of wound infection were not statistically significantly different between the prophylactic and non-prophylactic groups (odds ratio, 0.6; 95% confidence interval, 0-1.2).

In the group that received prophylactic flucloxacillin, there were 5 wound infections; 2 were moderate and treated with povidone-iodine antisepctic ointment and 3 were severe with delayed wound healing and disruption. In the group that received no prophylaxis, there were 8 wound infections; 1 was moderate and 7 were severe.

**DISCUSSION**

Our study demonstrates that incidence of moderate to severe wound infections following circumcision in a massive circumcision
reduces the risk of wound infection following medical male circumcision. 

program in Soweto is 1%. The rate of wound infection was not significantly lower in the men who received prophylactic flucloxacillin compared with nonrecipients.

Scale-up of MMC necessitates monitoring and improvement of safety. Infection has been recognized as the most common complication after circumcision and often the reason for hospital admission following traditional circumcision, followed by delayed wound healing and bleeding.17 The wound infection rate in our program compares favorably with rates in clinical trials. The complication rate in the Orange Farm trial in South Africa was 3.6%, of which 3.7% were wound infections. In Kisumu, Kenya, the complication rate was reported as 1.7% and 5 out of 21 of these were wound infections.4 Complications with traditional circumcisions are estimated to be about 35% in Kenya and 48% in South Africa.18 Other reports of complications rates in clinical settings have been reported as 18%-19%

There is limited data on the effect of prophylactic antibiotics on the incidence of wound infection following MMC. In our study, there was no significant difference with the use of prophylactic flucloxacillin. Flucloxacillin, also known as floxacin, is a relatively inexpensive beta-lactamase-stable penicillin antibiotic covering the narrow spectrum of gram-positive bacteria. Because most wound and skin infections are caused by Staphylococcus aureus, flucloxacillin prophylaxis seemed a reasonable choice. However flucloxacillin exhibits poor activity against non-β-lactamase-producing bacteria such as Streptococcus pyogenes, so polymicrobial infection is certainly 1 explanation for wound infection in the prophylaxis group.20 Flucloxacillin prophylaxis did not significantly reduce the incidence of infection in the treatment of open fractures.16

The limitations of our study include nonrandomization, although we attempted to control for this by choosing circumcision groups from 2 months with different prophylactic groups yet similar clinic workloads. There was a short follow-up duration and loss to follow-up in both groups, which may underestimate wound infections that occurred especially after 2 days. There are data to suggest that adverse event rates may be higher among circumcision clients who do not return for follow-up, with up to 8.6% reporting that they received care for adverse events at a health facility during home visits.21 Also, compliance to flucloxacillin—an antibiotic with an intensive dosing schedule of 4 times a day for 5 days—was not measured, which may have resulted in an overestimation of its effect.

**CONCLUSIONS**

Post-circumcision wound infections are not common in a massive MMC program in Soweto, South Africa. Routine use of prophylactic flucloxacillin does not seem to reduce the risk of postcircumcision wound infections. As the scale-up of circumcisions is being implemented in many developing countries, ongoing implementation research is needed on rates of and ways to reduce complications.

**References**


---

Coming Soon in AJIC


Eradication of carbapenem-resistant *Enterobacteriaceae* gastrointestinal colonization with nonabsorbable oral antibiotic treatment:
A prospective controlled trial

Disinfection of iPad to reduce contamination with *Clostridium difficile* and methicillin-resistant *Staphylococcus aureus*