

Snip and prevent! Medically performed circumcision – a strategy for reducing the transmission of HIV



M J Titus, MB ChB, FCOG

Department of Obstetrics and Gynaecology, Grey's Hospital, Pietermaritzburg

J Moodley, MB ChB, FRCOG, MD

Women's Health and HIV Research Unit, Department of Obstetrics and Gynaecology, Nelson R Mandela School of Medicine, University of KwaZulu-Natal, Durban

Background. Recent randomised trials carried out in South Africa and on the African continent have rekindled the debate on male circumcision for preventing conditions that may or may not occur in the future.

Method. The recent literature on adult male circumcision for the prevention of HIV transmission was reviewed and the traditional, religious, ethical, and public health issues of introducing male circumcision as a public health measure are discussed.

Conclusion. Male circumcision should be regarded as another strategy in the fight against the HIV pandemic. The main HIV strategies of single-partner relationships and consistent condom use should remain the main strategic policy against the HIV pandemic.

Male circumcision has been practised for thousands of years as part of a religious ceremony shortly after birth, as a traditional 'coming of age' at puberty in some cultures and as a medical procedure to prevent urinary tract and sexually transmitted infections, and for the treatment of phimosis. Simply put, male circumcision is the surgical removal of all or part of the prepuce (foreskin).

The surgical incision of healthy skin, particularly if done in childhood, for the prevention of diseases that may or may not occur years later has always been controversial. However, observational studies indicate that male circumcision may have beneficial effects in the prevention of HIV.^{1,2} In a prospective study of 2 298 HIV-uninfected men attending sexually transmitted clinics in India, Reynolds *et al.*¹ noted that circumcision was protective against HIV-1 infection (relative risk (RR) 0.15; 95% confidence interval (CI) 0.04 - 0.62; $p=0.0089$) but did not protect against other sexually transmitted infections (STIs) such as gonorrhoea. These authors suggested a biological rather than a behavioural effect for this reduction in acquiring HIV-1 in adult males. More recently, two randomised, controlled clinical trials (RCTs) have shown considerable benefit of medically performed adult male circumcision in reducing the transmission of HIV in men,^{3,4} confirming findings from an earlier study in South Africa.⁵ These three trials have significant public health implications in the fight against HIV/AIDS.³⁻⁵ The South African trial was carried out near Johannesburg; 3 274 young men aged 18 - 24

years were randomised to immediate ($N=1\ 617$) or later ($N=1\ 657$) circumcision. Following a planned interim analysis the trial was halted, as a 60% relative reduction in HIV risk associated with circumcision was found.⁵ Although these findings were seen in a positive light, concerns were raised about a number of methodological factors in this study. The results of two ongoing studies in Kenya and Uganda were therefore eagerly awaited. The results of these latter studies were published in *The Lancet* in February 2007.^{3,4} Both trials involved adult, HIV-negative, heterosexual male volunteers randomly assigned to either intervention (circumcision performed by trained medical professionals in a clinic setting) or no intervention (no circumcision). Men in the control group were offered circumcision at the end of the study. All participants were extensively counselled in HIV prevention and risk reduction techniques.

In Kenya, Baily *et al.*³ randomly assigned men aged 18 - 24 years to circumcision ($N=1\ 391$) or delayed circumcision ($N=1\ 393$); an interim analysis showed significant benefit from circumcision. There was an estimated 53 - 60% reduction in RR of HIV infection associated with circumcision.

The study in Uganda⁴ included 4 996 men aged 15 - 49 years and showed similar findings following an interim analysis. The estimated reduction in the RR of HIV infection was 51 - 55%. The HIV incidence was 0.66 per 100 person-years in the circumcision group and 1.33 per 100 person-years in the control group.

Hypothesis

The biological reasons for decreased susceptibility to HIV in circumcised men are thought to be multifactorial. Firstly, the internal mucosal layer of the prepuce has been shown to have a greater concentration of Langerhans cells and other HIV target cells such as macrophages and CD4 dendritic cells than cervical mucosa. It therefore has the ability to absorb the HIV more efficiently, and it is plausible that removal of the foreskin is a likely mechanism in reducing the chances of HIV infection. Secondly, the foreskin is susceptible to tears, abrasions and infections, particularly near the frenulum, facilitating HIV transmission. Thirdly, circumcision results in increased keratinisation of the glans when not protected by the foreskin; this acts as a protective keratin layer, minimising HIV penetration of the surface epithelium.³⁻⁶ Lastly, it is also hypothesised that male circumcision leaves only a small mucosal surface area in the urethral meatus open to recurrent infective exposures, which may induce a mucosal immune response and further protection above that of circumcision.⁷

The abovementioned RCTs now provide firm evidence that the risk of acquiring HIV infection in males is halved by medically performed male circumcision.³⁻⁶ It should be remembered however, that consistent use of condoms and monogamous sexual relationships remain an important primary prevention strategy against acquiring HIV infections, because male circumcision does not provide 100% protection. Furthermore, circumcision may not be protective against the 'receptive' partner in homosexual relationships, and its protective effect in transmission from male to female is unknown. In addition, as Reynolds *et al.*¹ have reported, adult male circumcision is not protective against other STIs, indicating that there are other routes of infection for gonorrhoea and chlamydia.¹ Gonorrhoea classically infects the urethra in males.

Concerns about male circumcision

Concerns have been raised over the fact that male circumcision may lead to 'behavioural disinhibition' and hence increased risk taking and reduced condom use. The Ugandan and Kenyan trials did not reveal evidence of 'risky behaviour' associated with circumcision. However, there was declining incidence of HIV infection in the control group in the Kenyan study, probably indicating an effect of continued counselling and education in a trial setting.^{2,3} In the Indian study by Reynolds *et al.*¹ there was no evidence of difference in sexual behavioural risk factors between circumcised and non-circumcised populations.

Theoretically, it is also possible that promotion of male circumcision may lead to 'female genital cutting' in some countries and that the same biological causality may be presented for female circumcision. A lot of effort has gone to reducing the prevalence of this harmful

practice by international health bodies. Furthermore, there are a number of groups that argue against the widespread use of male circumcision, because of the perception that it is mutilating and traumatic.⁸

Implementing male circumcision as a health policy

Studies in eastern and southern Africa have found reasonable acceptability of circumcision, ranging from 29% to 80%.⁹ Barriers to circumcision include fear of infection, bleeding, pain and financial costs.

Scaling up of male circumcision obviously poses immense problems. Besides minimising of the complications associated with circumcision, there is a great deal involved in implementing this surgical procedure on a population-wide basis – training of appropriate health personnel, purchasing the appropriate surgical equipment and instituting the necessary follow-up systems in poor countries. In addition, religious, social, cultural and financial resources need to be taken into account. In Asia, for example, cultural issues might be barriers to male circumcision. In South Africa the media, via the newspapers, indicate that there are already objections from traditional leaders. The National Traditional Health Practitioners Act indicates that traditional healers are allowed to perform male circumcision,¹⁰ but the Congress of Traditional Leaders of South Africa (CONTRALESA) does not allow monitoring or audits of this practice because it has cultural significance.¹¹ If male circumcision becomes a public health policy, there will clearly be a need to distinguish religious/traditional/spiritual circumcision from medically performed male circumcision for the prevention of HIV in adult males. All stakeholders in South Africa should be involved in discussions prior to instituting a public health programme on male circumcision, and lessons learnt from the Indian sub-continent's experience of 'mass tubal ligations' must be carefully considered.

Ethical issues

Owing to the potential complications and the uncertainty of benefit in a low-risk population, male circumcision as a preventive measure worldwide has met with some controversy. Fox and Thomson¹² state that it may be ethically inappropriate to subject neonates and children to the acknowledged risk of circumcision and argue that there is no compelling legal authority for the common view that circumcision is lawful. They argue that a surgical procedure which is a non-therapeutic, non-consensual excision of healthy tissue without clear medical benefits should not be tolerated by health professionals given the risk to young children. It is possible that this view might change, given the latest evidence from the Ugandan and Kenyan studies. If implementation of circumcision involves performing the procedure during infancy and childhood, then the ethical issue of the rights of the child and the parental cultural

rights must be taken into account.^{13,14} It may be argued, however, that circumcision in children is a feasible implementation strategy as the surgical procedure is simple and complications minimal.

Conclusion

Although there is now good scientific evidence that medically performed male circumcision reduces HIV-1 infection rates, it should be seen as just one of the strategies in the global fight against the spread of this pandemic. All individuals should be provided with a range of prevention practices. Safe sexual practices, single-partner relationships and the consistent use of condoms should remain the mainstay of this goal.

1. Reynolds SJ, Sheperd ME, Risbud AR, Gangakhedkar RR, Brookmeyer RS, Kivekar AD. Male circumcision and risk of HIV-1 and other sexually transmitted infections in India. *Lancet* 2004; 363: 1039-1040.
2. Weiss HA, Quigley MA, Hayes RJ. Male circumcision and risk of HIV infection in sub-Saharan Africa – a systematic review and meta-analysis. *AIDS* 2000; 14(15): 2361-2370.
3. Baily RC, Moses R, Parker CB. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. *Lancet* 2007; 369: 643-656.
4. Gray RH, Kigozi G, Serwadda D, et al. Male circumcision for HIV in men in Rakai, Uganda: a randomised trial. *Lancet* 2007; 369: 657-666.
5. Auvert B, Taljaard E, Sobngwi-Tambekou J, Sitta R, Puren A. Randomised, controlled intervention trial of male circumcision for reduction of HIV infection risk: the ANRS 1260 Trial. *PLoS Med* 2005; 2: 298.
6. Quinn TC. Circumcision and HIV transmission. *Curr Opin Infect Dis* 2007; 20(1): 33-38.
7. Waiver MJ, Reynolds SJ, Serwadda D, et al. Might male circumcision be more protective against HIV in the highly exposed? An immunological hypothesis. *AIDS* 2005; 19: 2181-2182.
8. Tanne JH. US group lobbies UN to outlaw male circumcision. *BMJ* 2005; 331: 422.
9. Drain PK, Halperin D, Hughes, Klausner J, Bailey R. Male circumcision, religion and infectious diseases: an ecologic analysis of 118 developing countries. *BMC Infect Dis* 2006; 6: 172-184.
10. Traditional Health Practitioners Act No. 35 of 2004, South Africa.
11. Hawker D, Makoba N. SABC pulls contentious drama on circumcision. *Pretoria News* 2007; 02/04, p. 3.
12. Fox M, Thomson M. A covenant with status quo? Male circumcision and the new BMA guidance to doctors. *J Med Ethics* 2005; 31: 463-469.
13. Benatar M, Benatar D. Between prophylaxis and child abuse; the ethics of neonatal circumcision. *Am J Bioeth* 2003; 3: 35-48.
14. United Nations Convention on the Rights of the Child, Article 19, 1989.