Circumcision: Position Paper on Neonatal Circumcision

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Neonatal circumcision is one of the most common surgical procedures performed in the United States. However, little is known about the long-term risks and benefits. There have been few methodologically generalizable prospective studies concerning medical outcomes.

The AAFP Commission on Science has reviewed the literature regarding neonatal circumcision. Evidence from the literature is often conflicting or inconclusive. Most parents base their decision whether or not to have their newborn son circumcised on nonmedical preferences (i.e. religious, ethnic, cultural, cosmetic). The American Academy of Family Physicians recommends physicians discuss the potential harms and benefits of circumcision with all parents or legal guardians considering this procedure for their newborn son.

Epidemiology

An estimated 1 million circumcisions are performed each year in the United States. (1) The rate of circumcision began rapidly to increase prior to World War II. The percent of men circumcised increased from 34% in 1932 to 60% in 1935. (2) In 1960, over 80% of men in the United States were circumcised. However, the percentage is now decreasing, and in 1992 the prevalence of circumcised men was estimated to be 77%. (2) One study found that between 1987 and 1996, 37% of newborn males were circumcised during newborn hospitalization. (3) Circumcision rates are shown to differ among racial and ethnic groups. (2)

Contraindications to Neonatal Circumcision

Circumcision should not be performed until at least 12 to 24 hours after birth to ensure that the infant is stable. This period of observation allows for recognition of abnormalities or illnesses that should either be addressed before circumcision (e.g., hyperbilirubinemia or infection) or would be a contraindication for the procedure (e.g., bleeding diathesis). When there is a family history of a bleeding disorder, appropriate laboratory studies should be done to identify a possible clotting dysfunction. Infants with genital-urinary congenital anomalies, particularly hypospadias, should not be circumcised because the foreskin is frequently used in reconstruction. Premature infants should meet criteria for discharge from the nursery before circumcision is performed. (4)

Complications of Neonatal Circumcision

Neonatal circumcision has an estimated complication rate ranging from 0.1% to 35%. The vast majority of complications are infection, bleeding, and failure to remove enough foreskin. (5) One study of more than 350,000 newborns identified a complication rate of 1/476 (3) and another study estimated a complication rate of 1/100. (4) Meatitis and meatal stenosis are more serious complications that have been reported to occur in 8% to 21% of circumcised infants, (6) however no well-controlled cohort study has clearly identified a causal relationship between circumcision and meatitis. (7) Although meatitis is believed to occur more frequently in circumcised infants, balanoposthitis is believed to occur more frequently in uncircumcised children. (8) Serious complications, such as necrotizing fascitis, urethral fistula, partial penile amputation, penile necrosis, and concealed penis, have been reported. (9) Death is rare, and mortality risk has been estimated to be 1/500,000 procedures. (10)

Urinary Tract Infections

Male infants account for 75% of urinary tract infections (UTIs) among infants less than 3 months of age, and comprise 11% of UTIs in infants between 3 to 8 months of age. (11) One study found that of 62 male infants with a confirmed UTI, 95% were uncircumcised. (11) Another study reviewed a 5-year period of U.S. military hospital records and found that 0.14% of 80,274 circumcised infants and 1.4% of 27,319 uncircumcised infants developed a UTI. (12) Although an uncircumcised infant has been estimated to have 3 to 20 times the risk of developing a UTI compared to a circumcised infant, the absolute risk increase is about 1%. (12) One study reports that 195 circumcisions are needed to prevent one UTI, (4) and another reports a number needed to treat (NNT) of 90. (3) Upper tract urinary infection, namely pyelonephritis, is reported to occur in 21% to 78% of infants and children with symptomatic UTI. (13) Renal scarring is estimated to develop in 10% to 15% of cases of pyelonephritis, and of those approximately 2% to 3% will develop end-stage renal disease. (14)

Sexually Transmitted Diseases and Human Immunodeficiency Virus

Overall, the studies investigating the association between having a sexually transmitted disease (STD)- excluding human immunodeficiency virus (HIV)- and being circumcised are inconclusive. (4) Although a number of studies did find that uncircumcised men had higher rates of STDs, the majority of these studies had methodological limitations. (5) The foreskin is thought to provide a moist environment to harbor bacteria and viruses, and some studies suggest an association with being uncircumcised and developing ulcerative STDs (i.e., syphilis, chancroid, and genital herpes) (15); however, the evidence does not show an association of being uncircumcised with developing nongonococcal urethrits or genital warts. (16) From one study of 2,776 documented cases of a STD, uncircumcised compared to circumcised men had an odds ratio of 4.0 (1.9 to 8.4) of having syphilis, an odds ratio of 1.6 (1.2 to 2.2) of having gonorrhea, and an odds ratio of 0.7 (0.5 to 0.9) of having genital warts; the association for nongonococcal urethritis, chlamydia, and genital herpes was not significant. (17) Some believe that the risk of having a STD is more strongly related to sexual practices than to the presence of a foreskin. (2)

Most of the studies on the relationship between acquiring HIV and being circumcised have been conducted in developing countries, particularly those in Africa. Because of the challenges with

maintaining good hygiene and access to condoms, these results are probably not generalizable to the U. S. population. These studies did, however, find an association between contracting HIV and being uncircumcised. Based on two of the African prospective studies, an estimated 10 to 20 circumcisions are needed to prevent one infection of HIV. (4) A literature review estimated that the risk ratios of HIV sero-conversion for uncircumcised men compared to circumcised men ranged from 2.3 to 8.1. (18) Limitations to the studies from which these risk ratios are derived include poor sampling, a low rate of acquiring the disease, and not controlling for confounders such as the number of sexual partners or other sexual practices. Because ulcerative STDs are more common in uncircumcised men than circumcised men, one hypothesis is that these lesions increase the probability of one becoming infected if exposed to HIV. (19)

Cancer of the Penis

Penile carcinoma is a rare disease in the United States with an estimated 750 to 1,000 cases diagnosed each year. There is a large variation in the incidence of penile cancer among countries where most men are uncircumcised. For example, Denmark has an annual incidence of 0.8 cases per 100,000 men compared to India which has an annual incidence of 10.5. (4) As with UTIs, the relative risk for uncircumcised men is a moderate 3.2, but the annual absolute risk increase is extremely small at 0.31 cases per 100,000 men per year, which would correspond to a NNT of over 300,000 to prevent one case of penile cancer per year. (20,4) However, one study estimates that 600 circumcisions are needed to prevent one lifetime case of penile cancer, and another study presents a NNT of 900. (21,3) Based on these NNTs, the absolute risk reduction for preventing one case of penile cancer per lifetime is less than 0.2%. In general, careful hygiene is believed to be important in preventing penile cancer. (5)

Cancer of the Cervix

Both cervical carcinoma and dysplasia are associated with specific serotypes of human papillomavirus (HPV). Because the foreskin provides a hospitable environment for viruses, some believe that a woman whose partner is uncircumcised may be at increased risk for cervical carcinoma. (22) The studies, which are methodologically challenged, have had conflicting results, yet most have found no association. (23) Clearly identified independent risk factors for developing cervical cancer include early age of first sexual activity, multiple partners, and smoking. In summary, the evidence to support an association between circumcision status and the risk of developing cervical cancer is inconclusive.

Sexual Functioning and Penile Problems

The effect of circumcision on penile sensation or sexual satisfaction is unknown. Because the epithelium of a circumcised glans becomes cornified, and because some feel nerve over-stimulation leads to desensitization, many believe that the glans of a circumcised penis is less sensitive. Opinions differ about how this decreased sensitivity, which may result in prolonged time to orgasm, affects sexual satisfaction. An investigation of the exteroceptive and light tactile discrimination of the glans of circumcised and uncircumcised men found no difference on comparison. (24) No valid evidence to date,

however, supports the notion that being circumcised affects sexual sensation or satisfaction.

Anesthesia

Newborns experience pain during circumcision. (1) When anesthesia is used, methods include the topical eutectic mixture of local anesthetics (EMLA), the dorsal penile nerve block (DPB), and the ring block. A randomized controlled trial investigating these methods in 52 infants found that all provided more analgesia than placebo based on heart rate, cry, and methemoglobin levels, and that the ring block was the most effective. (25) Complications from local anesthesia are uncommon and consist mainly of hematomas and local skin necrosis. The most common complication is bruising; one study on complications found bruising in 11% of neonates who had a DPB, (26) and another found a minor complication rate of 1.2%, of which bruising was the most frequent. (27) There have not been any studies to evaluate the long-term complications of the various analgesics.

Future Need for Circumcision

Penile cancer is claimed by some to be an indication for circumcision in the adult, but its prevalence is low. Recurrent balanitis is an indication, particularly in men with diabetes mellitus. A frequent indication is phimosis, which cannot be diagnosed in the newborn because the cleavage plane between the glans and the deep preputial layer of the penis in not developed at birth; often the foreskin is not retractable until 3 years of age. An estimated 10% of men will develop phimosis. (28,29) Although neonatal circumcision has fewer complications than adult circumcision, evidence to support routine neonatal circumcision in order to prevent the need for adult circumcision is not available.

Informed Consent and the Medical Ethics of Circumcision

Obtaining informed consent for medical procedures is an important practice. In emergent cases when a parent or legal guardian is not available to give consent, a procedure will often be performed if it is judged to be life-sustaining and in the best interest of the patient. When a person having a procedure is unable to give consent and a guardian is present, the guardian’s consent is acceptable. This occurs for routine medical procedures of clear benefit to children such as immunizations. A physician performing a procedure for other than medical reasons on a nonconsenting patient raises ethical concerns.

While routine circumcision is widely practiced, the small medical benefits of circumcision lead many to consider routine circumcision to be a cosmetic procedure. This leads to questions regarding medical ethics and whether and how to present to a parent a balanced discussion of the relative benefits and harms of the procedure. Key to the ethical discussion is respect of the parent’s religious, ethnic, or other cultural beliefs for which circumcision is practiced.

Economic Analysis

One cost-effectiveness analysis estimated that the lifetime cost difference for men who were circumcised

was $25, with a benefit of 10 additional days of life. (30) Another analysis estimated that routine circumcision cost $102 per person, resulting in 14 hours of extended life. (31) These findings suggest that cost factors should be removed from the decision of circumcision. (4)

Summary

Considerable controversy surrounds neonatal circumcision. Putative indications for neonatal circumcision have included preventing UTIs and their sequelae, preventing the contraction of STDs including HIV, and preventing penile cancer as well as other reasons for adult circumcision. Circumcision is not without risks. Bleeding, infection, and failure to remove enough foreskin occur in less than 1% of circumcisions. Evidence-based complications from circumcision include pain, bruising, and meatitis. More serious complications have also occurred. Although numerous studies have been conducted to evaluate these postulates, only a few used the quality of methodology necessary to consider the results as high level evidence.

The evidence indicates that neonatal circumcision prevents UTIs in the first year of life with an absolute risk reduction of about 1% and prevents the development of penile cancer with an absolute risk reduction of less than 0.2%. The evidence suggests that circumcision reduces the rate of acquiring an STD, but careful sexual practices and hygiene may be as effective. Circumcision appears to decrease the transmission of HIV in underdeveloped areas where the virus is highly prevalent. No study has systematically evaluated the utility of routine neonatal circumcision for preventing all medically-indicated circumcisions in later life. Evidence regarding the association between cervical cancer and a woman’s partner being circumcised or uncircumcised, and evidence regarding the effect of circumcision on sexual functioning is inconclusive. If the decision is made to circumcise, anesthesia should be used.

The American Academy of Family Physicians recommends physicians discuss the potential harms and benefits of circumcision with all parents or legal guardians considering this procedure for their newborn son. (2001)

References

1. Robson WL. The circumcision question. Postgraduate Medicine 1992;91:237-243.
2. Laumann EO et al. Circumcision in the United States. JAMA 1997;277:1052-7.
3. Christakis DA et al. A trade-off analysis of routine newborn circumcision. Pediatrics 2000; 105:246-9.
4. Learman LA. Neonatal circumcision: a dispassionate analysis. Clinical Obstetrics and Gynecology 1999;42:849-859.
5. Kaplan GW. Complications of Circumcision. Urol Clin North Am 1983;10:543-9.
6. Harkavy KL. The circumcision debate (Letter). Pediatrics 1987;79:649.
7. Anderson GF. Circumcision. Pediatric Annals 1989;18:205-213.
8. Fergusson DM et al. Neonatal circumcision and penile problems. Pediatrics 1988;81:537-541.
9. Niku SD et al. Neonatal circumcision. Urol Clin North Am 1995;22:57-65.
10. King LR. Neonatal circumcision in the United States in 1982. J Urol 1982;128:1135-6.

11. Ginsburg CM et al. Urinary tract infections in young infants. Pediatrics 1982;69:409-412.
12. Wiswell TE. Urinary tract infection and the uncircumcised state: an update. Clin Pediatrics 1993;32:130-134.
13. Rushton HG. The evaluation of acute pyelonephritis and renal scarring with technetium 99m-dimercaptosuccinic acid renal scintigraphy: evolving concepts and future directions. Urological Review 1997;11:108-120.
14. Roberts JA. Neonatal circumcision: an end to the controversy. South Med J 1996;89:167-171.
15. Moses S et al. The association between lack of male circumcision and risk for HIV infection. Sexually Transmitted Diseases 1994;21:201-210.
16. Parker SW et al. Circumcision and sexually transmissible disease. Med J Australia 1983;2:288-290.
17. Cook LS. Circumcision and sexually transmitted diseases. Am J Public Health 1994;84:197-201.
18. Moses S et al. Male circumcision: an assessment of health benefits and risks. Sexually Transmitted Infections 1998;74:368-373.
19. Caldwell JC et al. The African AIDS epidemic. Scientific American 1996;274:62-68.
20. Maden C et al. History of circumcision, medical conditions, and sexual activity and risk of penile cancer. J Natl Cancer Inst 1993;85:19-24.
21. Kochen M et al. Circumcision and the risk of cancer of the penis. Am J Dis Child 1980;134:484-6.
22. Burger R et al. Why circumcision? Pediatrics 1974;54:362-2.
23. Preston EN. Whither the foreskin? JAMA 1970;213:1853-8.
24. Masters WH et al. Human Sexual Response. Little, Brown and Company. Boston 1966.
25. Lander J et al. Comparison of ring block, dorsal penile nerve block, and topical anesthesia for neonatal circumcision. JAMA 1997;278:2157-2162.
26. Snellman LW et al. Prospective evaluation of complications of dorsal penile nerve block for neonatal circumcision. Pediatrics 1995;95:705-708.
27. Fontaine P et al. The safety of dorsal penile nerve block for neonatal circumcision. J Fam Prac. 1994;39:243-248.
28. Gairdner D. The fat of the foreskin. Brit Med J 1949;2:1433.
29. Herzog LW et al. The frequency of foreskin problems in uncircumcised children. Am J Dis Child 1986;140:254-6.
30. Lawler FH et al. Circumcision: a decision analysis of its medical value. Fam Med 1991;23:587-593.
31. Ganiats TG et al. Routine neonatal circumcision: a cost-utility analysis. Med Decis Making 1991;11:282-293.

Table 1: Summary of Literature Regarding Neonatal Circumcision and Medical Outcomes

Author and study type	Outcome	Comment

Crain [1990], Case [n=22], Control [n=177].	*.21 [.07-.60]odds of being circumcised if a case *based on reported data: 82% of cases were not circumcised vs. 48% of controls [p<.0001]	Infants who presented to ER with fever.
Craig [1996], Case [n=144], Control [n=742].	OR, controlled for age =.18 [.05-.7] Authors estimate 79.2% of UTIs attributable to no circumcision in boys less than 5 years of age	Boys <5 years of age identified by positive urine cultures from ambulatory pediatric department
Rushto [1992], Case [n=23], Control [n=63].	*OR =.076 [.016-.353] *based on reported percentage of cases without circumcision [91.3% vs. controls 44%] [p<.001]	Based on infants admitted with UTI and fever. No significant differences between race and socioeconomic status or between cases and controls
Bennett [1998], Case [n=36], Control [n=200].	OR = .20 [.09-.44] Based on reported 72% of cases having been uncircumcised vs. 35% of controls	Boys <18 years of age diagnosed with epididymitis. Controls based on consecutive hospital admissions for nonurological problems
To [1998] Cohort of 30,105 boys who were circumcised and 38,995 who were not circumcised.	Relative risk for hospitalization if uncircumcised: 3.7 (2.8-5.0) Attributable risk of admission over one year per 1,000 boys: 5.14. 195 circumcisions needed to prevent one hospitalization	Hospital admission data only. Controlled for socioeconomic status. Did not account for outpatient circumcisions.
Wiswell [1993]. Cohort of 80,274 infants who were circumcised and 27,319 who were not circumcised	Percentage circumcised boys with UTI: .14%, Uncircumcised: 1.4%	U.S. Military Hospital record review of infants born between Jan. 1985 to Dec. 1990
Wiswell [1993]. Meta-analysis of 9 papers.	Odds ratio of being uncircumcised if a case [UTI]: 12.0 [10.6-13.6]	

Chessare [1992] Decision analysis.	Probability of UTI had to be greater than .29 in order to favor circumcision	Analysis very sensitive to utilities assigned to minor complications of bleeding and or pain. Utility assigned to pain had to be .9867 or higher in order to favor circumcision
HIV		
Cameron Case[N=293], Kenya.	RR=8.1 (3.4-19.7)	*Only crude proxies to control for sexual practices. Most Muslims
Tyndall Case [N=413], Kenya.	RR=4.5 (2.6-7.7)	Are circumcised and difficult to control for other lifestyle patterns associated with religion. Circumcision based on self report often mis-classified and up to 16% are functionally not circumcised. Ulcerative diseases (esp. chancroid) are common and chancroid is more common in men who are not circumcised
Telzac Case [N=758], USA.	3.5 (.8-15.8)	Very low incidence of HIV. Insufficient power
Mehendale Case [N=721], India.	RR=2.9 (p=.11)	Low number of circumcised men in sample
Lavreys Case [N=746], Kenya.	RR=2.3 (1.0-5.1)	*Adjusted for potential confounders
Kapiga Case [N= 471], Women attending a family planning clinic.	RR=3.4 (1.03-11.3)	*Adjusted for potential confounders
Grosskurth Case [N=12,534], Prevalence study.	OR=1.24 (p=.14)	Authors speculate that they have missed controlling for lifestyle factors that may be associated with circumcision
Learman	10-20 circumcisions to prevent one HIV infection	Based on prospective studies from Rwanda and Tanzania. Because of hygiene and very low prevalence of chancroid in the U.S., probably not applicable to the U.S.
SEXUALLY TRANSMITTED DISEASES		

Cook [1994].	OR (syphilis)= 4.0 (1.9-8.4)	Adjusted for race, number of partners, place of residence, and other STDs. No association with nongonnoccal urethritis, chlamydia, and genital herpes. Only identified cases by positive cultures. Will miss many cases of asymptomatic genital herpes
PENILE CANCER		
Learman	Absolute risk reduction: .31 cases of penile carcinoma per 100,000 males a year. 322,000 circumcisions to prevent one case of penile carcinoma a year	Virtually all cases of penile cancer occur in uncircumcised men. Incidence, however is very low (2 per 100 000 uncircumcised men per year). Other public health strategies such as hygiene are much more effective
CERVICAL CANCER		
Agarwal [1993]. Case control.	OR=4.1	Recent mutivariate analysis of data did not support this association. (Learman) Age at initiation of sexual activity, number of partners, and smoking are much more important risk factors
SAFETY OF LOCAL ANESTHESIA		
Snellman [1995]. Prospective follow-up of 491 infants who had DPB.	11% had bruising at time of discharge, all of which resolved at two weeks	Relied on returned questionnaires from pediatrician's office. Only a two-week follow-up
Fontaine [1994] Record review 1,022 charts.	1.2% had minor complications (11 minor bruising at site, one with "excessive bleeding")	

These recommendations are provided only as an assistance for physicians making clinical decisions regarding the care of their patients. As such, they cannot substitute for the individual judgment brought to each clinical situation by the patient's family physician. As with all reference resources, they reflect

the best understanding of the science of medicine at the time of publication, but they should be used with the clear understanding that continued research may result in new knowledge and recommendations.