



Report 10 of the Council on Scientific Affairs (I-99) Full Text

Neonatal Circumcision

FULL TEXT

NOTE: This report represents the medical/scientific literature on this subject as of December 1999.

Resolutions 505 and 507, introduced by the Medical Student Section and referred to the Board of Trustees at the 1998 Interim Meeting, asked: "That the American Medical Association (AMA) study and make recommendations on the issue of pain control during male infant circumcision; and that the AMA disseminate information to assist physicians in providing medical knowledge about non-therapeutic neonatal male circumcision to parents."

This report is confined to circumcisions that are not performed for ritualistic or religious purposes. In this case, the term "non-therapeutic" is synonymous with elective circumcisions that are still commonly performed on newborn males in the United States.

Methods

Published studies from the years 1966 to July 1999 were identified through MEDLINE and Lexis/Nexis Medical Library searches of English-language articles using the key words *circumcision*, *male*, *adverse effects*, and *pain control*. Related articles in the MEDLINE database using the additional MeSH term *pain prevention & control* also were identified. A total of 338 articles were retrieved. Additional articles were identified by manual review of the references cited in these publications.

Background

The normal uncircumcised penis consists of a cylindrical shaft and rounded tip (glans) that are separated by a tissue groove (coronal sulcus). The fold of skin (foreskin) covering the glans is removed during the circumcision procedure to a point near the coronal sulcus. At birth, separation of the foreskin from the glans is incomplete. The separation process continues through childhood via desquamation and epidermal keratinization of the shaft. Keratinization does not occur on the mucosal surface of the foreskin, which may contain specialized sensory cells. Eventually, unforced and complete retraction of the foreskin can be accomplished.

The majority of newborn males in the United States are circumcised, although the percentage varies by location, religious affiliation, and socioeconomic classification. The prevalence of circumcision in the United States increased from about 30% in the 1930s to nearly 80% by the early 1970s. During this time frame, whites were more likely to be circumcised than blacks or Hispanics.¹ While the circumcision rate appeared to decline in the 1970s and early 1980s, rates of more than 80% were described in studies limited to Atlanta and US Army Hospitals.²⁻⁴ Estimates based on the National Center for Health Statistics indicate that 61% and 65% of male infants were circumcised in the United States during 1987 and 1995, respectively.^{5,6} Ritual circumcision is common in the Jewish and Islamic faiths, but uncommon altogether in Asia, South and Central America, and most of Europe.

Based on recent survey data, 54% of pediatricians, family practitioners, and obstetricians perform at least 1 circumcision per month. Of physicians performing circumcision, 45% use anesthesia, most commonly dorsal penile block with lidocaine (71% of pediatricians, 56% of family practitioners, and 25% of obstetricians). Those physicians who reported not using anesthesia cited concern about adverse effects and a belief that circumcision does not warrant anesthesia.⁷

Current Specialty Society Recommendations

Recent policy statements issued by professional societies representing Australian, Canadian, and American pediatricians do not recommend routine circumcision of male newborns.^{5,8-10} The most recent statement by the American Academy of Pediatrics reads as follows: "Existing scientific evidence demonstrates potential medical benefits of newborn male circumcision; however, these data are not sufficient to recommend routine neonatal circumcision. In circumstances in which there are potential benefits and risks, yet the procedure is not essential to the child's current well-being, parents should determine what is in the best interest of the child. To make an informed choice, parents of all male infants should be given accurate and unbiased information and be provided the opportunity to discuss this decision. If a decision for circumcision is made, procedural analgesia should be provided."

This statement modifies the Academy's 1989 conclusion that newborn male circumcision has "potential medical benefits and advantages as well as disadvantages and risks."¹¹ The 1989 statement by the Academy reversed a long-standing opinion that medical indications for routine circumcision were lacking. It emerged primarily on the basis of data that suggested circumcision caused a large reduction in the risk of urinary tract infections, particularly within the first year of life.

In a joint publication with the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists (ACOG) concluded in 1997 that "newborn circumcision is an elective procedure to be performed at the request of the parents on baby boys who are physiologically and clinically stable."¹² From the standpoint of ACOG's Practice Activities Division, as a surgical procedure with concomitant pain, the use of analgesia during circumcision is advocated, but the preferred mode of pain relief is not specified (Stanley Zinberg, MD. Personal communication. September 1999). The current clinical policy on neonatal circumcision contained in the American Academy of Family Physicians Reference Manual states: "Current medical literature regarding neonatal circumcision is controversial and conflicting". The decision to perform neonatal circumcision should be based on the informed consent of the parents, and requires objective, factual counseling of parents by the family physician" (Available at: www.aafp.org/policy/camp/4.html). A 1995 Fact Sheet for physicians offered by the American Academy of Family Physicians is currently being revised.¹³ The British Medical Association has a longstanding recommendation that circumcision should be performed only for medical reasons.¹⁴

Risk-Benefit Analysis of Circumcision

Debate on the wisdom of routine circumcision centers on the possible benefits offered by circumcision, and whether they medically justify the risks associated with the procedure. Properly performed circumcision protects against the development of phimosis, paraphimosis in elderly men requiring intermittent or chronic bladder catheterization, and balanitis.⁵ The only longitudinal study to address the former found a 4% incidence of phimosis in uncircumcised boys.¹⁵ The medical benefits suggested to accrue from circumcision are reduced incidence of urinary tract infection in infant males, decreased incidence of penile cancer in adult males, and possibly decreased susceptibility to certain sexually transmissible diseases, including human immunodeficiency virus (HIV).

Urinary Tract Infection: There is little doubt that the uncircumcised infant is at higher risk for urinary tract infection (UTI), although the magnitude of this risk is debatable. A meta-analysis of 9 studies published between 1984 and 1992 revealed a 12-fold increased risk of

UTI in uncircumcised males.⁴ Most of the studies analyzed were case-control designs that analyzed the rate of UTI in the first year of life. A more recent population-based cohort found a relative risk of 3.7 for hospitalization for UTI in the first year of life in uncircumcised boys.¹⁶ A similar relative risk (4.8) was detected in another case-control study.¹⁷ **The reliability of many studies examining circumcision status and UTI in infant males is weakened by lack of controls for potential confounders such as prematurity, extent of breastfeeding, and the method of urine collection used to identify bacteriuria.**

Despite the increased relative risk in uncircumcised infants, the absolute incidence of UTI is small in this population (0.4%-1%).¹⁸ **Depending on the model employed, approximately 100 to 200 circumcisions would need to be performed to prevent 1 UTI.**^{16,19} In this case, a large relative risk reduction translates into a small absolute risk reduction because the baseline prevalence is low. One model of decision analysis concluded that the incidence of UTI would have to be substantially higher in uncircumcised males to justify circumcision as a preventive measure against this condition.²⁰

Penile Cancer: Penile cancer is a rare disease in the United States (0.9 to 1 per 100,000). Among uncircumcised men the incidence is estimated to be 2.2/100,000.²¹ Six case series published between 1932 and 1986 found that all penile cancers occurred in uncircumcised individuals.^{11,22} Results of one case control study provide an exception to this general rule, although circumcision status was determined by self-report.²³ Nevertheless, this study also found that the absence of neonatal circumcision increased the risk for penile cancer by a factor of 3.2 Other identified risk factors for penile cancer are phimosis (occurring exclusively in uncircumcised males), genital warts, infection with human papilloma virus, large number of sexual partners, and cigarette smoking.²³⁻²⁵ **Nevertheless, because this disease is rare and occurs later in life, the use of circumcision as a preventive practice is not justified.**

Human Immunodeficiency Virus Infection and Sexually Transmissible Diseases: The data on circumcision status and susceptibility to HIV infection and other sexually transmissible diseases have been recently reviewed.^{5,26,27} Five of 7 prospective studies involving heterosexual transmission of HIV-1 found a statistically significant association between lack of circumcision and elevated risk for acquisition of HIV (relative risks 2.3-8.1). In the other 2 studies the relative risk exceeded 3 in uncircumcised males, but a low proportion of uncircumcised men and a small percentage of seroconversion limited the statistical power of these studies.

At least 16 studies have examined the relationship between circumcision and sexually transmissible diseases other than HIV.²⁷ In general, circumcised individuals appear to have somewhat lower susceptibility to acquiring chancroid and syphilis, possibly genital herpes, and gonorrhea compared to individuals in whom the foreskin is intact. The available data on nongonococcal urethritis and genital warts are inconclusive

Regardless of these findings, **behavioral factors are far more important risk factors for acquisition of HIV and other sexually transmissible diseases than circumcision status, and circumcision cannot be responsibly viewed as "protecting" against such infections.**

Complications of Circumcision

Two large series detected a complication rate between 0.2% and 0.6% in circumcised infants.^{28,29} Bleeding and infection, occasionally leading to sepsis, are the most common adverse events requiring treatment. In the majority of cases, bleeding is minor and hemostasis can be achieved by pressure application. Other untoward events can result from taking too much skin from the penile shaft causing denudation or rarely, concealed penis, or from not removing sufficient foreskin, producing an unsatisfactory cosmetic result or recurrent phimosis.^{30,31} Other postoperative complications include formation of skin bridges between the penile shaft and glans, meatitis and meatal stenosis, chordee, inclusion cysts in the circumcision line, lymphedema, hypospadias and epispadias, and urinary retention.³² Case reports have associated circumcision with other rare but severe events including scalded skin syndrome, necrotizing fasciitis, sepsis and meningitis,

urethrocutaneous fistulas, necrosis (secondary to cauterization), and partial amputation of the glans penis.^{5,30,32}

Provision of Anesthesia During Circumcision

Ordinary humanitarian sentiment prevents consideration of circumcision without anesthesia. It is perfectly true that millions of infants have been circumcised while entirely conscious, and no subsequent evil has befallen them; I do not believe, however, that any physician would rend a mother's heart by so tormenting her babe. It is specious to hold that an infant's sensibilities are not sufficiently developed to perceive pain. (Ferd C. Valentine, MD, Professor of Genito-Urinary Diseases, New York School of Clinical Medicine. Presented to the Section on Diseases of Children at the 51st Annual Meeting of the American Medical Association, June 5-8, 1900.)

Clinical and biochemical evidence indicates that newborn infants exhibit physiological, autonomic, and behavioral responses to noxious stimuli. Acute responses of neonates to painful stimuli include large increases in heart rate, increased blood pressure, decreased transcutaneous pO₂ values, decreased vagal tone, crying, breath holding, gagging, behavioral changes, and increases in serum cortisol.^{33,34} Resolution of these changes is fairly rapid following the procedure.³⁵ Although it has been assumed that there are no long-term psychological sequelae from this procedure, circumcised infants who were not anesthetized at the time of the procedure show stronger pain responses to vaccinations at 4 and 6 months of age than do uncircumcised infants or infants who received a topical anesthetic cream at the time of circumcision.³⁶

The use of sucrose-dipped pacifiers (24% solution) reduces crying time during circumcision and also modestly attenuates increases in heart rates (50% solution), but less so than the use of dorsal penile nerve block (see below).^{37,38}

Dorsal Penile Nerve Block (DPNB): First described in 1978,³⁹ DPNB using 1% lidocaine effectively reduces the behavioral⁴⁰ and physiological indicators of pain caused by circumcision. While recognizing that restraint itself is stressful, results of several double-blind, placebo-controlled studies confirm that DPNB prevents or decreases excursion from baseline values for heart rate, tissue oxygenation, and percentage of time spent crying during the circumcision procedure. Additionally, DPNB decreases behavioral scores indicative of agitation and pain and attenuates increases in plasma cortisol concentrations associated with circumcision.⁴¹⁻⁴⁷ Chlorprocaine is comparable to lidocaine and may possess a slightly faster onset of regional anesthesia.⁴⁸

The major complications of DPNB are bruising at the injection site (11%) that resolves within 1 to 2 weeks, and occasionally bleeding.^{49,50} Systemic lidocaine toxicity has not been described. One case of penile necrosis after DPNB has been reported.⁵¹ Evaluation of possible complications of DPNB has been limited to a 3-month follow-up.

Topical Local Anesthesia: (Eutectic mixtures [EMLA]) EMLA is an acronym for eutectic mixture of local anesthetic. Each gram (1 mL) of cream contains lidocaine 2.5% (25 mg) and prilocaine 2.5% (25 mg). In one unblinded study, the application of 0.5 mL (1 g) under occlusion 55 to 70 minutes prior to restraint was associated with only modest attenuation of changes in heart rate, oxygen saturation, crying time, and facial grimacing compared to placebo cream.⁵² Results of a randomized, double-blind, controlled trial were similar.⁵³ It is noteworthy that in adults, the duration of anesthesia after genital application of EMLA is considerably less than at other cutaneous sites.⁵⁴ In the absence of dose-response data, it is uncertain whether the maximal anesthetic effects on infants from EMLA had waned in these studies by the time the actual circumcision procedure was performed.

Because EMLA contains prilocaine, the development of methemoglobinemia (MetHb) is a possibility. However, when measured, blood concentrations of MetHb in neonates after

application of 1 to 2 g of EMLA cream have been well below toxic values.^{53,55-57}

In a randomized, placebo-controlled study, application of 0.5 g of 30% lidocaine cream 20 minutes prior to circumcision was associated with less stress-related behaviors and smaller increases in plasma beta-endorphin concentrations than placebo. No other physiological variables were monitored and other studies on topical lidocaine have not been reported.⁵⁸

Subcutaneous Ring Block: Ring block performed using 1 mL of 0.5% lidocaine without epinephrine delivered subcutaneously and circumferentially at the base of the penis significantly attenuates circumcision-induced increases in heart rate and crying and decreases in O₂ saturation.⁵⁹

Comparative Studies: In 3 comparative studies DPNB was significantly more effective than EMLA cream in attenuating pain scores and physiological changes associated with circumcision.^{55,60,61} However, in one study the dose of EMLA was only 0.5 g and was applied 1 hour before the procedure.⁶⁰ In another, the dose was 2 g applied 90 minutes before the procedure.⁵⁵ In the third study, the dose of EMLA was not specified.⁶¹ Ring block was more effective than either DPNB or EMLA in preventing increases in heart rate and reducing crying time.⁵⁵

Despite the clear evidence that newborn males generate brisk pain responses during circumcision, and the availability of methods to reduce pain during the procedure, a recent survey of residency training programs found that 26% of programs that taught circumcision provided no instruction on the use of local anesthesia. In programs that taught circumcision, pediatric (84%) and family practice residents (80%) were more likely than obstetric residents (60%) to learn about anesthetic techniques to prevent pain associated with circumcision.⁶² Significant regional variation occurred within and across medical specialties.

Summary and Comment

Virtually all current policy statements from specialty societies and medical organizations do not recommend routine neonatal circumcision, and support the provision of accurate and unbiased information to parents to inform their choice. The recent policy revision by the American Academy of Pediatrics also states that analgesia (anesthesia) should be provided for the procedure.

Circumcision decreases the incidence of urinary tract infections in the first year of life, and also protects against the development of penile cancer later in life. The circumcised male also may be somewhat less susceptible to HIV infection and certain sexually transmissible diseases. The low incidence of urinary tract infections and penile cancer mitigates the potential medical benefits compared with the risks of circumcision. In the case of sexual transmission of HIV, behavioral factors are far more important in preventing these infections than the presence or absence of a foreskin.

A majority of boys born in the United States still undergo nonritual circumcisions. This occurs in large measure because parental decision-making is based on social or cultural expectations, rather than medical concerns.⁶³⁻⁶⁷ Studies from the 1980s suggested that the presentation of medical information on the potential advantages and disadvantages of circumcision had little influence on parents' decisions.⁶⁴⁻⁶⁶ This finding was recently confirmed.⁶⁸ In another contemporary study, nearly half of those physicians performing circumcisions did not discuss the potential medical risks and benefits of elective circumcision prior to delivery of the infant son. Deferral of discussion until after birth, combined with the fact that many parents' decisions about circumcision are preconceived, contribute to the high rate of elective circumcision.^{67,68} Major factors in parental decision-making are the father's circumcision status, opinions of family members and friends, a desire for conformity in their son's appearance, and the belief that the circumcised penis is easier to care for with respect to local hygiene.

When the decision is made to proceed with circumcision, local anesthesia should be provided for the procedure. Ring block or dorsal penile blocks are most effective. EMLA cream has limited utility but has not been sufficiently investigated with regard to dose-response effects.

RECOMMENDATIONS

The following statements, recommended by the Council on Scientific Affairs, were adopted by the AMA House of Delegates as AMA policy at the 1999 AMA Interim Meeting.

1. The AMA encourages training programs for pediatricians, obstetricians, and family physicians to incorporate information on the use of local pain control techniques for neonatal circumcision.

2. The AMA supports the general principles of the 1999 Circumcision Policy Statement of the American Academy of Pediatrics, which reads as follows: Existing scientific evidence demonstrates potential medical benefits of newborn male circumcision; however, these data are not sufficient to recommend routine neonatal circumcision. In circumstances in which there are potential benefits and risks, yet the procedure is not essential to the child's current well-being, parents should determine what is in the best interest of the child. To make an informed choice, parents of all male infants should be given accurate and unbiased information and be provided the opportunity to discuss this decision. If a decision for circumcision is made, procedural analgesia should be provided.

3. The AMA urges that as part of the informed consent discussion, the risks and benefits of pain control techniques for circumcision be thoroughly discussed to aid parents in making their decisions.

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