
Male neonatal circumcision

An evidence- based review

Controversy and confusing study results confound parents and clinicians alike. Despite some proven medical benefits of circumcision, cultural and religious beliefs still usually determine whether this procedure will be performed.

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The prevalence of neonatal circumcision increased dramatically during the early part of the last century, from about 30% in the 1930s to around 80% by the 1970s.¹ After the 1970s the prevalence of the procedure declined somewhat, but current statistics indicate that 61% to 65% of male infants still have it performed on them during the neonatal period.^{2,3} This decline can be attributed, in part, to a 1971 American Academy of Pediatrics (AAP) policy statement that scientific data did not support the need for routine circumcision.⁴ But most often the decision to circumcise a male child is based on religious and cultural practices, not on scientific data, and confusion about the procedure's benefits and risks is a big part of the reason. Although numerous studies have been conducted on the procedure, major disagreements still exist on how to interpret the results. Even studies that purported to show the benefits of circumcision have been criticized for failing to control confounding variables.

In 1989, the AAP updated its position by stating that studies indicated that the procedure was at least partially effective in preventing urinary tract infections

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(UTIs) and some sexually transmitted diseases (STDs).³ However, the AAP continued to deemphasize the necessity of circumcision, stressing instead that a full review of the risks and benefits was necessary before making a decision to perform the procedure.³ Inherent in this statement is awareness that parents' cultural, religious, and ethnic traditions are important aspects of the decision and that these must be balanced against the medical risks and benefits³ (see Table 1). Some years later, the American Medical Association (AMA) issued a similar policy statement acknowledging the aforementioned benefits, while noting that the risk of UTI in boys was extremely low regardless of circumcision status and that behavioral factors were far and away the most important aspect of STD prevention.⁵

Today, the controversy surrounding neonatal circumcision has expanded to include surgical pain and postsurgical complications, as well as the procedure's preventive effects on penile cancer, UTIs, STDs, and phimosis and paraphimosis. The results of studies conducted over the past 5 years suggest that neonatal circumcision has distinct benefits and identify techniques that minimize discomfort and surgical risk. This article examines each of these issues and discusses the recent scientific studies.

Surgical pain and anesthetics

It is well known that an infant experiences pain during circumcision and that a sucrose nipple, the traditional anesthetic, does not provide adequate pain relief.^{6,7} Both the AAP and the AMA recommend using a eutectic mixture of local anesthetics (EMLA cream), dorsal penile nerve block (DPNB), or a subcutaneous penile ring block.^{3,5} The DPNB and the subcutaneous penile ring block may be used together. All

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three have been proven to reduce surgical pain by a significant degree, but subcutaneous anesthetics are more effective than EMLA cream.^{8,9} The subcutaneous anesthetics reduced pain 34% to 76%, as measured by duration of crying, infant heart rate, and facial grimacing.¹⁰⁻¹⁴ EMLA cream reduced pain 20% to 55% in essentially the same parameters.^{8,9,15,16}

Both the DPNB and the subcutaneous ring block use lidocaine without epinephrine, with local bruising being the most common complication.^{11,12,17,18} The literature

describes an occasional hematoma resulting from use of these anesthetics, and one case of penile necrosis has been reported.¹⁹ EMLA cream is a lidocaine-prilocaine mixture applied topically to the penile shaft about 1 hour before the procedure. In addition to being less effective than the injectable anesthetic, it also has the potential to cause methemoglobinemia.^{8,15,16} Newborns and premature infants are somewhat more susceptible to this very rare but serious complication.²⁰ Few studies on controlling postoperative pain exist, probably because clinicians generally believe that such pain is effectively controlled with topical petroleum or oral acetaminophen.²¹ This is not recommended because acetaminophen has the potential to mask temperature changes needed to assess for neonatal sepsis. Combining topical petroleum gel with either the DPNB or the subcutaneous ring block is the recommended method for controlling postoperative pain.

Surgical complications

The surgical complication rate for circumcision is 0.2% to 1.5%, with minor bleeding and infection accounting for the majority of cases.²²⁻²⁵ Higher rates were reported in a few studies, probably because insignificant oozing was included as a complication.²⁶ Rare complications include denudation of the penile shaft, laceration and necrosis of the glans penis, meatal stenosis, urinary retention, urethral fistula formation, and death.^{5,7} Surgical instruments that allow complete visualization of the glans throughout the procedure, such as the Plastibell device and the Gomco clamp, have lower rates of complications than those that conceal the glans during the procedure²⁷ (see Figures 1 and 2, page 34).

Penile cancer

Circumcision's preventive effect on penile cancer is an interesting issue because the risk of acquiring the disease is extremely low regardless of circumcision status. The incidence of penile cancer in the United States is 0.9 per 100,000 men, with the risk increasing to 2.2 per 100,000 for uncircumcised men. Critics of circumcision often cite penile cancer incidence rates in countries such as Denmark, where the large majority of men are uncircumcised yet the penile cancer incidence rate is only 0.8 per 100,000 men, to point out that frequency of sexual intercourse, cigarette smoking, and the presence of venereal warts and other STDs are more important factors in disease development.⁷ Both the AAP and the AMA note that the risk of acquiring penile cancer is greater among uncircumcised men than among circumcised men; however, they also say that the absolute risk of penile cancer is low enough that circumcision should not be recommended as a preventive measure.^{3,5}

Urinary tract infections

Circumcision provides some degree of protection against UTIs during the first year of life. But as with penile cancer, the significance of this is debatable. In 1993, a meta-analysis showed a 12-fold increase in UTI risk among uncircumcised male infants, but another study concluded that there was only a 3.7-fold increased risk of acquiring UTIs among uncircumcised children to begin with.^{28,29}

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Key Points

- ▶ Although numerous studies have been conducted on circumcision, major disagreements exist on the interpretation of the results.
- ▶ An infant experiences pain during circumcision, and a sucrose nipple, the traditional anesthetic, does not provide adequate pain relief. More modern anesthetic techniques should be used instead.
- ▶ The surgical complication rate is 0.2% to 1.5%, with minor bleeding and infection accounting for the majority of cases.
- ▶ Although circumcision has preventive effects against STDs, the risk of acquiring some of the other conditions it may help to prevent is low, and so for many parents, the benefits of circumcision will not outweigh the risks.

Competencies

Medical knowledge	◆◆◆◆
Interpersonal & communication skills	◆◆◆◆◆
Patient care	◆◆◆◆◆
Professionalism	◆◆◆◆
Practice-based learning and improvement	◆◆◆
Systems-based practice	◆

For an explanation of competencies ratings, see the table of contents.

TABLE 1

Discussion points for neonatal circumcision

- Parents' cultural and religious beliefs and their influence on decision making
- Medical benefits and surgical risks
- Potential exposure to HIV infection and other STDs
- Surgical technique, anesthesia, and postoperative care and pain relief
- Insurance coverage
- Surgical consent form

FIGURE 1

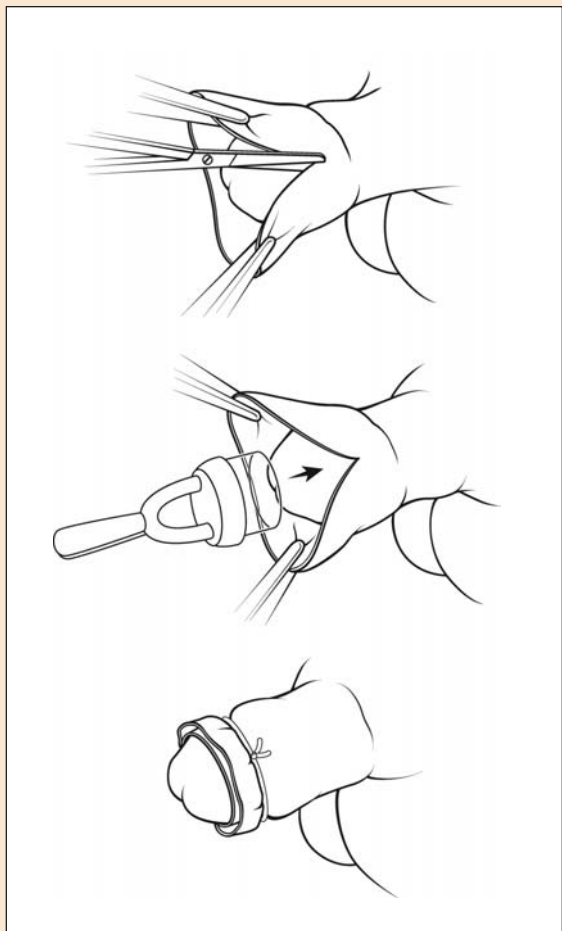
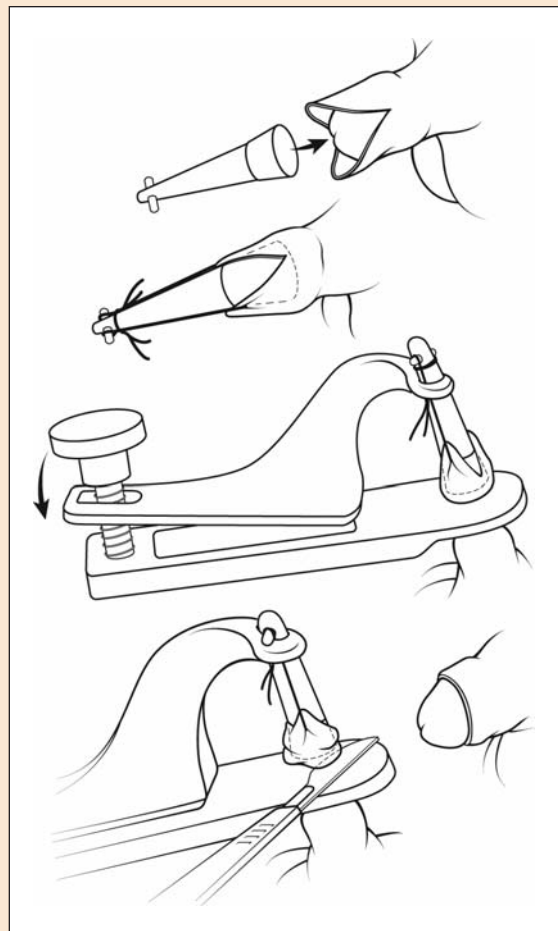
Plastibell device

FIGURE 2

Gomco clamp

Kristen Weinandt-Marzejon

Additionally, the absolute risk of developing a UTI during infancy and early childhood remains very low—0.12% to 0.19% for circumcised boys and 0.7% to 1.4% for uncircumcised boys.³ For this reason, both the AAP and the AMA do not recommend circumcision to prevent UTIs.^{3,30}

Sexually transmitted diseases

Numerous studies, dating as far back as the 1940s, have focused on an association between circumcision and STD prevention. Approximately half of these studies showed a positive relationship between the two; however, the remainder of the studies showed virtually no relationship between the two.⁷ Those that indicated a positive relationship hypothesized that a general toughening of the glans skin in circumcised males and a relative ease in recognizing ulcerative disease of the penis accounted for the difference between the two populations. In 1999 the AAP issued a statement acknowledging that circumcision decreases the risk of acquiring syphilis, and the AMA fol-

lowed with a statement suggesting that circumcised males were somewhat less susceptible to HIV infection and certain other STDs than were uncircumcised men.^{3,5}

Support for the procedure was stated more strongly in 2000 by Schoen and colleagues.³¹ These researchers indicated that an analysis of data showed a strong association between uncircumcised status and the increased risk of genital ulcer disease, particularly chancroid and syphilis.³¹ Following this, a meta-analysis of 28 studies on HIV disease transmission concluded that the risk of acquiring heterosexually-transmitted HIV infection was 1.5 to 8.4 times greater in uncircumcised men than in circumcised men.³² In 2005, a 21-month study, which included approximately 3,000 South African heterosexual men, concluded that circumcision provided a 65% protective effect in female-to-male transmission of HIV disease during regular sexual intercourse.³³ A 2006 longitudinal study of over 500 New Zealand males revealed that neonatal circumcision has the potential to reduce

the incidence of STDs by approximately 48% over a lifetime.³⁴ The STDs considered in the New Zealand study included genital warts, gonorrhoea, chlamydia, and genital herpes. The reason for this protection is uncertain, although some have argued that the penile foreskin is particularly susceptible to penetration by genital bacteria and viruses.

Phimosis and paraphimosis

While circumcision completely prevents phimosis and paraphimosis, the likelihood of developing either condition remains relatively low in uncircumcised males. Moreover, both conditions can be easily prevented with adequate hygiene. For example, in a recently completed study involving approximately 2,000 Danish schoolboys, only 4% of the boys had problems with phimosis and tight prepuces and these were largely minimal.³⁵ A few cases of paraphimosis have been reported, but STD-related balanitis or failure to maintain good hygiene was indicated as the cause. This suggests that effective patient education and early STD treatment are usually adequate preventive measures.^{36,37}

Other issues

A reduced risk of cervical cancer in female partners of circumcised men has been documented by numerous studies,³⁸⁻⁴² but other studies refute this, including the aforementioned New Zealand studies, which did not specifically indicate there was a decreased incidence of human papillomavirus infections in circumcised males.^{22,34,43} Masters and Johnson long ago disproved the claim that circumcised men experience less sexual pleasure than their uncircumcised counterparts in their extensive studies on male sexual arousal and pleasure.⁴⁴

Conclusion

Circumcision, like any surgical procedure, has risks, and even though most are relatively minor, parents must be thoroughly educated about them. When parents do choose circumcision, newer forms of anesthesia effectively minimize infant discomfort during the procedure and should be used instead of or in addition to a sucrose nipple. Current evidence supports the practice of neonatal male circumcision based on the procedure's ability to prevent UTIs, phimosis, paraphimosis, STDs, and cancer. The risk of acquiring some of these conditions is extremely low at baseline to begin with, however, and for many parents, the benefits of circumcision will not outweigh the risks. □

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