AMERICAN ACADEMY OF PEDIATRICS

Task Force on Circumcision

Circumcision Policy Statement

ABSTRACT. 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.

ABBREVIATIONS. UTI, urinary tract infection; STD, sexually transmitted disease; NCHS, National Center for Health Statistics; DPNB, dorsal penile nerve block; SCCP, squamous cell carcinoma of the penis; HPV, human papilloma virus; HIV, human immunodeficiency virus.

Although [1]the exact frequency is unknown, it is estimated that 1.2 million newborn males are circumcised in the United States annually at a cost of between $150 and $270 million. This practice has been advocated for reasons that vary from symbolic ritual to preventive health measure. Until the last half century, there has been limited scientific evidence to support or repudiate the routine practice of male circumcision.

Over the past several decades, the American Academy of Pediatrics has published several policy statements on neonatal circumcision of the male infant.[1–3] Beginning in its 1971 manual, *Standards and Recommendations of Hospital Care of Newborn Infants,* and reiterated in the 1975 and 1983 revisions, the Academy concluded that there was no absolute medical indication for routine circumcision.

In 1989, because of new research on circumcision status and urinary tract infection (UTI) and sexually transmitted disease (STD)/acquired immunodeficiency syndrome, the Academy concluded that newborn male circumcision has potential medical benefits and advantages as well as disadvantages and risks.[4] This statement also recommended that when circumcision is considered, the benefits and risks should be explained to the parents and informed consent obtained. Subsequently, a number of medical societies in the developed world have published statements that do not recommend routine circumcision of male newborns.[5–7] In its position statement, the Australian College of Paediatrics emphasized that in all cases, the medical attendant should avoid exaggeration of either risks or benefits of this procedure.[5]

Because of the ongoing debate, as well as the publication of new research, it was appropriate to reevaluate the issue of routine neonatal circumcision. This Task Force adopted an evidence-based approach to analyzing the medical literature concerning circumcision. The studies reviewed were obtained through a search of the English language medical literature from 1960 to the present and, additionally, through a search of the bibliographies of the published studies.

EPIDEMIOLOGY

The percentage of male infants circumcised varies by geographic location, by religious affiliation, and, to some extent, by socioeconomic classification. Circumcision is uncommon in Asia, South America, Central America, and most of Europe. In Canada, ~48% of males are circumcised.[8] Some groups such as followers of the Jewish and Islamic faiths practice circumcision for religious and cultural reasons.[9,10]

There are few data to help estimate accurately the number of newborn males circumcised annually in the United States. According to the National Center for Health Statistics (NCHS), 64.1% of male infants were circumcised in the United States during 1995 (unpublished data, 1997). However, data from the NCHS are based on voluntary collection of data from participating hospitals; <5% of hospitals in the United States participate. Thus, NCHS data provide an inadequate sample to estimate national circumcision frequency.

More specific data on circumcision rates are >1 decade old. Data obtained from hospital records in metropolitan Atlanta, GA, document circumcision rates of 84% to 89% in the period 1985 to 1986.[11] This study demonstrated that hospital discharge data, which rely on medical record face sheet information, underestimate the true incidence of neonatal circumcision. Using such hospital discharge data, it was estimated that 45.5% of male infants born in New York City and 69.6% of male infants born elsewhere in New York State were circumcised at birth during the year 1985.[12] In addition, none of these sources included rates for ritual circumcision or subsequent outpatient procedures, thus, these rates of circumcision are even more likely to be underestimated.

Differences in circumcision rates related to demographic variables are not well described. One study, which surveyed adult men, suggested that in the United States, the frequency of circumcision varies

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

directly with maternal education, a marker for socioeconomic status.[13] Circumcision rates also vary among racial and ethnic groups, with whites considerably more likely to be circumcised than blacks or Hispanics (81% vs 65% or 54%).[13]

EMBRYOLOGIC AND ANATOMIC CONSIDERATIONS

Embryologically, the penis glans derives from the genital tubercle, which has developed by 4 to 6 weeks' gestation. The primitive urethral folds present in the male human embryo fuse to form the penile urethra. The genital swellings, present early in development, subsequently become the scrotum in males. The skin of the body of the penis begins growing forward at about 8 weeks' gestation and covers the glans eventually. Initially, squamous epithelium has no separation between the glans and the foreskin. Separation of epithelial layers that may be only partially complete at birth progress with the development of desquamated tissue in pockets until the complete separation of tissue layers forms the preputial space. As a result of this incomplete separation, the prepuce or foreskin may not be fully retractable until several years after birth. In ~90% of uncircumcised males, the foreskin is retractable by age 5 years. Partial adhesions with smegma accumulation may persist in small numbers of uncircumcised males through childhood and even into adolescence.[14–16]

Epidermal keratinization occurs on the skin of the penile shaft but not on the mucosal surface of the foreskin.[15] One study suggests that there may be a concentration of specialized sensory cells in specific ridged areas of the foreskin but not in the skin of the penile shaft.[17] There are conflicting data regarding the immune capabilities of preputial tissue. Studies differ on the number, distribution, and location of Langerhans' cells in the foreskin.[18,19] No controlled scientific data are available regarding differing immune function in a penis with or without a foreskin.

PENILE PROBLEMS

Penile problems may develop in both circumcised and uncircumcised males. The true frequency of these problems is unknown. In one 8-year study of a cohort of 1948 uncircumcised Danish schoolboys between 6 and 17 years of age, 4% of the boys had phimosis (which prevented the foreskin from being retracted by gentle manipulation) and 2% had "tight prepuce" so that the foreskin could be retracted but with slight difficulty.[16]

The only longitudinal study to address this issue in both circumcised and uncircumcised boys followed a birth cohort of 500 New Zealand boys until the age of 8 years; it was noted that the relationship between risks of penile problems and circumcision status varied with the child's age.[20] The majority of these problems were described as penile inflammation and were noted to be relatively minor. In this study, circumcised infant boys had a significantly higher risk of penile problems (such as meatitis) than did uncircumcised boys, whereas, after infancy, the rate of penile problems (such as balanitis and inflammation of the foreskin) were significantly higher in older uncircumcised boys.

A retrospective survey conducted at two inner city clinics asked parents of boys 4 months to 12 years of age to recall whether their sons had ever developed any penile problems. Hispanic parents constituted 73% of those responding. Although parents of uncircumcised boys reported an increased number of medical visits for penile problems, the frequency of balanitis and irritation was not significantly different between circumcised and uncircumcised boys.[21] In addition, most of the problems reported were minor. Case reports suggest an increased frequency of paraphimosis in uncircumcised elderly men who require intermittent or chronic bladder catheterization.[22–24] Other case reports indicate that balanitis occurs more frequently in uncircumcised men than in circumcised men and suggest an increased frequency of balanitis in men with diabetes and in uncircumcised soldiers during wartime.[25]

Chronic inflammation of the foreskin may result in a secondary phimosis caused by scarring.[23,26] Medical therapy has been successful in resolving both secondary phimosis and paraphimosis, but surgical intervention is sometimes indicated.[22,23,26–28]

THE ROLE OF HYGIENE

Circumcision has been suggested as an effective method of maintaining penile hygiene since the time of the Egyptian dynasties, but there is little evidence to affirm the association between circumcision status and optimal penile hygiene.

In one study, appropriate hygiene decreased significantly the incidence of phimosis, adhesions, and inflammation, but did not eliminate all problems.[29] In this study, 60% of parents remembered receiving instructions on the care of the uncircumcised penis, and most followed the advice they were given. Various studies suggest that genital hygiene needs to be emphasized as a preventive health topic throughout a patient's lifetime.[16,21,29,30]

SEXUAL PRACTICE, SENSATION, AND CIRCUMCISION STATUS

A survey of adult males using self-report suggests more varied sexual practice and less sexual dysfunction in circumcised adult men.[13] There are anecdotal reports that penile sensation and sexual satisfaction are decreased for circumcised males. Masters and Johnson noted no difference in exteroceptive and light tactile discrimination on the ventral or dorsal surfaces of the glans penis between circumcised and uncircumcised men.[31]

METHODS OF CIRCUMCISION

There are three methods of circumcision that are commonly used in the newborn male. These all include the use of devices: the Gomco clamp, the Plastibell device, and the Mogen clamp (or variations derived from the same principle on which each of these devices is based).

The elements that are common to the use of each of these devices to accomplish circumcision include the following: estimation of the amount of external skin

to be removed; dilation of the preputial orifice so that the glans can be visualized to ensure that the glans itself is normal; bluntly freeing the inner preputial epithelium from the epithelium of the glans; placing the device (at times a dorsal slit is necessary to do so); leaving the device in situ long enough to produce hemostasis; and amputation of the foreskin.

It is important that those who practice circumcision become sufficiently skilled at the technical aspects of the procedure so that complications can be minimized. Those performing circumcision should be adept at suturing to ensure that hemostasis can be secured when necessary and that skin edges can be brought together if they should separate widely. If circumcision is done in the newborn period, it should be performed only on infants who are stable and healthy.

COMPLICATIONS OF THE CIRCUMCISION PROCEDURE

The true incidence of complications after newborn circumcision is unknown.[32] Reports of two large series have suggested that the complication rate is somewhere between 0.2% and 0.6%.[33,34] Most of the complications that do occur are minor.[35] The most frequent complication, bleeding, is seen in ~0.1% of circumcisions.[35] It is quite rare to need transfusion after a circumcision because most bleeding episodes can be handled quite well with local measures (pressure, hemostatic agents, cautery, sutures). Infection is the second most common of the complications, but most of these infections are minor and are manifest only by some local redness and purulence.[33] There also are isolated case reports of other complications such as recurrent phimosis, wound separation, concealed penis, unsatisfactory cosmesis because of excess skin, skin bridges, urinary retention, meatitis, meatal stenosis, chordee, inclusion cysts, and retained Plastibell devices.[35] Case reports have been noted associating circumcision with such rare events as scalded skin syndrome, necrotizing fasciitis, sepsis, and meningitis, as well as with major surgical problems such as urethral fistula, amputation of a portion of the glans penis, and penile necrosis.[32,35]

CIRCUMCISION AFTER THE NEWBORN PERIOD

Should circumcision become necessary after the newborn period because problems have developed, general anesthesia is often used and requires a more formal surgical procedure necessitating hemostasis and suturing of skin edges. Although the procedural complications are generally the same as those of newborn circumcision, there is the added risk attendant to general anesthesia if it is used. Additionally, there is morbidity in the form of time lost from school or work to be considered.

ANALGESIA

There is considerable evidence that newborns who are circumcised without analgesia experience pain and physiologic stress. Neonatal physiologic responses to circumcision pain include changes in heart rate, blood pressure, oxygen saturation, and cortisol levels.[36–39] One report has noted that circumcised infants exhibit a stronger pain response to subsequent routine immunization than do uncircumcised infants.[40] Several methods to provide analgesia for circumcision have been evaluated.

Eutectic Mixture of Local Anesthetics (EMLA Cream)

EMLA cream, containing 2.5% lidocaine and 2.5% prilocaine, attenuates the pain response to circumcision when applied 60 to 90 minutes before the procedure. Compared with placebo groups, neonates who had EMLA cream applied spend less time crying and have smaller increases in heart rate during circumcisions.[41–43] The analgesic effect is limited during the phases associated with extensive tissue trauma such as during lysis of adhesions and tightening of the clamp.[42,43]

Ideally, 1 to 2 g of EMLA cream is applied to the distal half of the penis, which then is wrapped in an occlusive dressing. There is a theoretic concern about the potential for neonates to develop methemoglobinemia after the application of EMLA cream, because a metabolite of prilocaine can oxidize hemoglobin to methemoglobin. When measured, blood levels of methemoglobin in neonates after the application of 1 g of EMLA cream have been well below toxic levels.[42–46] Two cases of methemoglobinemia in infants occurred after ≥3 g of EMLA cream was applied; in 1 of these cases, the infant also was receiving sulfamethoxazole.[47,48] EMLA cream should not be used in neonates who are receiving other drugs known to induce methemoglobinemia.

Dorsal Penile Nerve Block (DPNB)

DPNB is very effective in reducing the behavioral and physiologic indicators of pain caused by circumcision. Compared with control subjects who received no analgesia, neonates with DPNB cry 45% to 76% less,[39,49–51] have 34% to 50% smaller increases in heart rate,[50,52] and have smaller decreases in oxygen saturation during the procedure.[39,52] Additionally, DPNB lidocaine attenuates the adrenocortical stress response compared with control subjects who received no injections or injections of saline.[49] The technique of Kirya and Werthmann is used most commonly to perform the block.[53] A 27-gauge needle is used to inject the 0.4 mL of 1% lidocaine, to be administered at both the 10- and 2- o'clock positions at the base of the penis. The needle is directed posteromedially 3 to 5 mm on each side until Buck's fascia is entered. After aspiration, the local anesthetic is injected. Systemic lidocaine levels obtained with use of this technique demonstrated peak concentrations at 60 minutes, well below toxic ranges.[52] Several studies evaluating the efficacy of DPNB reported bruising as the most frequent complication.[49,50,54,55] Hematomas were rarely seen and caused no long-term injury.[50,56] A single report of penile necrosis may have been secondary to the surgical technique rather than to the DPNB.[57]

Subcutaneous Ring Block

A subcutaneous circumferential ring of 0.8 mL of 1% lidocaine without epinephrine at the midshaft of the penis was found to be more effective than EMLA

cream or DPNB in a recent study.[43] Although all treatment groups experienced an attenuated pain response, the ring block appeared to prevent crying and increases in heart rate more consistently than did EMLA cream or DPNB throughout all stages of circumcision. In another study, after a subcutaneous injection of lidocaine had been given at the level of the corona, it was noted that fewer infants cried during the dissection of the foreskin, placement of the bell, and clamping of the Gomco, compared with those infants with a DPNB.[58] Additionally, the cortisol response was diminished in the subcutaneous group compared with the DPNB group.[58] No complications of this simple and highly effective technique have been reported.

Others

Sucrose on a pacifier has been demonstrated to be more effective than water for decreasing cries during circumcision.[59] Acetaminophen may provide analgesia after the immediate postoperative period.[60] Neither technique is sufficient for the operative pain and cannot be recommended as the sole method of analgesia. A more physiologic positioning of the infant in a padded environment also may decrease distress during the procedure.[61]

In summary, analgesia is safe and effective in reducing the procedural pain associated with circumcision and, therefore, adequate analgesia should be provided if neonatal circumcision is performed. EMLA cream, DPNB, and a subcutaneous ring block are options, although the subcutaneous ring block may provide the most effective analgesia.

CIRCUMCISION STATUS AND UTI IN INFANT MALES

There have been several studies published in the medical literature over the past 15 years that address the association between circumcision status and UTI.[62–68] Because the majority of UTI in males occur during the first year of life, almost all the studies that examine the relationship between UTI and circumcision status focus on this period. All studies have shown an increased risk of UTI in uncircumcised males, with the greatest risk in infants younger than 1 year of age.

Initial retrospective studies suggested that uncircumcised male infants were 10 to 20 times more likely to develop UTI than were circumcised male infants.[62] A review published in 1993 summarized the data from nine studies and reported that uncircumcised male infants had a 12.0-fold increased risk of UTI compared with circumcised infant males.[69] More recent studies using cohort and case–control design also support an association, although reduced in magnitude.[63,64,67,70–72] These studies have found a three to seven times increased risk of UTI in uncircumcised male infants compared with that in circumcised male infants. This consistent association was found in samples from populations in which circumcision rates varied from low (<20%),[67] to medium (45%),[72] to high (75%).[63,64] One of these, a population-based cohort study of 58 000 Canadian infants, found that the hospital admission rate for UTI in infant males younger than 1 year of age was 1.88 per 1000 in circumcised infants and 7.02 per 1000 in uncircumcised infants, for a relative risk of 3.7.[72]

The proportion of male infants who have symptomatic UTI during the first year of life is somewhat difficult to estimate because the rate varies among studies. A study at an urban emergency department found that 2.5% of febrile male infants <60 days of age had UTI.[71] Data from Europe, based on a largely uncircumcised population, report UTI rates of 1.2% for infant boys.[73] The number is similar to the rates of 0.7% to 1.4% reported for uncircumcised males in the United States and Canada.[72,74] In comparison, UTI rates for circumcised male infants in the United States and Canada are reported to be 0.12% to 0.19%.[72,74] Although these cross-cultural data do not provide information on specific individual risk factors, the similarity of European and American UTI rates for uncircumcised male infants support an association between circumcision status and UTI. Using these rates and the increased risks suggested from the literature, one can estimate that 7 to 14 of 1000 uncircumcised male infants will develop a UTI during the first year of life, compared with 1 to 2 of 1000 circumcised male infants.

Although all these studies have shown an increased risk of UTI in uncircumcised male infants, it is difficult to summarize and compare the results because of differences in methodology, samples of infants studied, determination of circumcision status, method of urine collection, UTI definition, and assessment of confounding variables. Furthermore, in some studies, methods for determining the reliability of the data were not described.

Few of the studies that have evaluated the association between UTI in male infants and circumcision status have looked at potential confounders (such as prematurity, breastfeeding, and method of urine collection) in a rigorous way. For example, because premature infants appear to be at increased risk for UTI,[75–77] the inclusion of hospitalized premature infants in a study population may act as a confounder by suggesting an increased risk of UTI in uncircumcised infants. Premature infants usually are not circumcised because of their fragile health status.[78]

In another example, breastfeeding was shown to have a threefold protective effect on the incidence of UTI in a sample of uncircumcised infants. However, breastfeeding status has not been evaluated systematically in studies assessing UTI and circumcision status.[79]

One study suggested that the method used to obtain urine for culture may influence the rate of infection,[64] with the greatest risk for infection noted in uncircumcised male infants who had samples obtained by catheterization, compared with those who had samples obtained by suprapubic aspiration. The three methods of urine collection in male infants (suprapubic aspiration vs catheterization vs bag) vary significantly in their accuracy of diagnosing UTI. Suprapubic aspiration is considered the "gold standard" but may not be used in clinical practice for reasons of parent and physician preference as well as for efficiency.[80,81] No studies addressing the associa-

tion between UTI and circumcision status have used suprapubic aspiration exclusively; one study, however, did use suprapubic aspiration in 92% of urine collections and noted a 10-fold increased risk of UTI in uncircumcised male infants compared with circumcised infants.[66] There are no studies comparing urine obtained by suprapubic aspiration and urethral catheterization in uncircumcised males. In the only study comparing the accuracy of catheterization and suprapubic aspiration in a sample of 35 asymptomatic boys (1 uncircumcised, 28 circumcised, and 6 with circumcision status not reported), the one false-positive urine sample with significant bacterial growth was obtained by catheterization of a 1-year-old uncircumcised male. A study in newborns demonstrated that urine sample obtained by bag technique is inadequate for diagnosing UTI in an uncircumcised male because of the high false-positive rate[82]; however, a negative bagged urinalysis and culture makes the diagnosis of UTI unlikely.

There is a biologically plausible explanation for the relationship between an intact foreskin and an increased association of UTI during infancy. Increased periurethral bacterial colonization may be a risk factor for UTI.[69] During the first 6 months of life, there are more uropathogenic organisms around the urethral meatus of uncircumcised male infants than around that of circumcised male infants, but this colonization decreases in both groups after the first 6 months.[65] In addition, it was demonstrated in an experimental preparation that uropathogenic bacterial adhered to and readily colonized the mucosal surface of the foreskin, but did not adhere to the keratinized skin surface of the foreskin.[70]

In children, UTI usually necessitate a physician visit and may involve the possibility of an invasive procedure and hospitalization. Studies on the morbidity and mortality associated with UTI in infancy have been confused by the inclusion of high-risk neonates and those with congenital anomalies.[83,84] The evidence that does exist suggests that the incidence of bacteremia associated with UTI occurs primarily during the first 6 months of life and is inversely related to age.[62–64,85] Although the overall incidence of bacteremia associated with UTI is 2% to 10% during the first 6 months of life, it has been noted to be as high as 21% in the neonatal period.[85,86]

Symptomatic UTI in infancy is considered to be a marker for congenital anomalies of the genitourinary tract; however, not all infants who have UTI will have abnormal radiologic findings. A published review suggests that the majority of children with UTI will have normal radiographic examination results.[87] There is a lack of information on the sequelae of UTI in infants with a normal genitourinary system.

There may be a relationship between young age at first symptomatic UTI and subsequent renal scar formation.[88,89] Similarly, there may be a relationship between young age (≤3 years) at first episode of pyelonephritis and decreased glomerular filtration rate.[90] However, the relationship between renal scar formation and renal function is not well defined, and the long-term clinical significance of renal scars remains to be demonstrated.

Data from multiple studies suggest that uncircumcised male infants are perhaps as much as 10 times more likely than are circumcised male infants to experience a UTI in the first year of life. This means that an uncircumcised male infant has an approximate 1 in 100 chance of developing a UTI during the first year of life; a circumcised male infant has an approximate 1 in 1000 chance of developing a UTI during the first year of life. Published data from a population-based cohort study of 58 000 Canadian infants suggest an increased risk of UTI in uncircumcised infant males of lower magnitude than data from previous studies. Using data from this study, an uncircumcised male infant has a 1 in 140 chance of being hospitalized for a UTI during the first year of life; a circumcised male infant has an approximate 1 in 530 chance of being hospitalized for a UTI during the first year of life.

In summary, all studies that have examined the association between UTI and circumcision status show an increased risk of UTI in uncircumcised males, with the greatest risk in infants younger than 1 year of age. The magnitude of the effect varies among studies. Using numbers from the literature, one can estimate that 7 to 14 of 1000 uncircumcised male infants will develop a UTI during the first year of life, compared with 1 to 2 of 1000 circumcised male infants. Although the relative risk of UTI in uncircumcised male infants compared with circumcised male infants is increased from 4- to as much as 10-fold during the first year of life, the absolute risk of developing a UTI in an uncircumcised male infant is low (at most, ~1%).

CIRCUMCISION STATUS AND CANCER OF THE PENIS

Cancer of the penis is a rare disease; the annual age-adjusted incidence of penile cancer is 0.9 to 1.0 per 100 000 males in the United States.[91] In countries where the overwhelming majority of men are uncircumcised, the rate of penile cancer varies from 0.82 per 100 000 in Denmark[92] to 2.9 to 6.8 per 100 000 in Brazil[93] and 2.0 to 10.5 per 100 000 in India.[94]

The literature on the relationship between circumcision status and risk of squamous cell carcinoma of the penis (SCCP) is difficult to evaluate. Reports of several case series have noted a strong association between uncircumcised status and increased risk for penile cancer[95–97]; however, there have been few rigorous hypothesis-testing investigations. SCCP exists in both preinvasive (carcinoma in situ) and invasive forms.[98] Precancerous SCCP lesions and in situ SCCP often occur primarily on the shaft of the penis, whereas invasive SCCP may be more likely to involve the glans. It is unclear whether preinvasive and invasive forms of SCCP are separate diseases or whether invasive SCCP develops from preinvasive SCCP.[99] This uncertainty makes analyzing the literature difficult. Uncircumcised status has been strongly associated with invasive SCCP in multiple case series.

The major risk factor for penile cancer across three case–control studies was phimosis. Other risk factors identified include "previous genital condition," gen-

ital warts, >30 sexual partners, and cigarette smoking.[100–102] Two of the studies were conducted in areas of the world that do not practice neonatal circumcision. In the third study, in which 45% of the men in the control group had been circumcised as neonates, the risk of SCCP among men who were never circumcised was 3.2 times that of men circumcised at birth. This study did not analyze in situ and invasive SCCP separately. This study also used self-report to determine circumcision status. Self-report may not be an accurate method of determining circumcision status.[103]

The strength of the association between sexual behavior in the development of penile cancer is unclear. Although there is an association of human papilloma virus (HPV) DNA and genital warts with penile cancer, the percentage of penile cancers with HPV DNA is lower than that of four other anogenital tumors (anus, cervix, vulva, vagina), implying that sexual transmission may be less of a factor in the genesis of SCCP than of these other cancers.[104] It may be that HPV is a co-factor for penile cancer, but that other conditions also must be present for progression to malignancy.

Neonatal circumcision confers some protection from penile cancer; however, circumcision at a later age does not seem to confer the same level of protection.[105] There is at least a threefold increased risk of penile cancer in uncircumcised men; phimosis, a condition that exists only in uncircumcised men, increases this risk further.[92,106] The relationship among hygiene, phimosis, and penile cancer is uncertain, although many hypothesize that good hygiene prevents phimosis and penile cancer.[92]

An annual penile cancer rate of 0.9 to 1.0 per 100 000 translates to 9 to 10 cases of penile cancer per year per 1 million men. Although the risk of developing penile cancer in an uncircumcised man compared with a circumcised man is increased more than threefold, it is difficult to estimate accurately the magnitude of this risk based on existing studies. Nevertheless, in a developed country such as the United States, penile cancer is a rare disease and the risk of penile cancer developing in an uncircumcised man, although increased compared with a circumcised man, is low.

CIRCUMCISION STATUS AND STD INCLUDING HUMAN IMMUNODEFICIENCY VIRUS (HIV)

Evidence regarding the relationship of circumcision to STD in general is complex and conflicting.[13,107–110] Studies suggest that circumcised males may be less at risk for syphilis than are uncircumcised males.[107,111] In addition, there is a substantial body of evidence that links noncircumcision in men with risk for HIV infection.[19,112–114] Genital ulcers related to STD may increase susceptibility to HIV in both circumcised and uncircumcised men, but uncircumcised status is independently associated with the risk for HIV infection in several studies.[115–117] There does appear to be a plausible biologic explanation for this association in that the mucous surface of the uncircumcised penis allows for viral attachment to lymphoid cells at or near the surface of the mucous membrane, as well as an increased likelihood of minor abrasions resulting in increased HIV access to target tissues. However, behavioral factors appear to be far more important risk factors in the acquisition of HIV infection than circumcision status.

ETHICAL ISSUES

The practice of medicine has long respected an adult's right to self-determination in health care decision-making. This principle has been operationalized through the doctrine of informed consent. The process of informed consent obligates the physician to explain any procedure or treatment and to enumerate the risks, benefits, and alternatives for the patient to make an informed choice. For infants and young children who lack the capacity to decide for themselves, a surrogate, generally a parent, must make such choices.[118]

Parents and physicians each have an ethical duty to the child to attempt to secure the child's best interest and well-being.[119] However, it is often uncertain as to what is in the best interest of any individual patient. In cases such as the decision to perform a circumcision in the neonatal period when there are potential benefits and risks and the procedure is not essential to the child's current well-being, it should be the parents who determine what is in the best interest of the child. In the pluralistic society of the United States in which parents are afforded wide authority for determining what constitutes appropriate child-rearing and child welfare, it is legitimate for the parents to take into account cultural, religious, and ethnic traditions, in addition to medical factors, when making this choice.[119]

Physicians counseling families concerning this decision should assist the parents by explaining the potential benefits and risks and by ensuring that they understand that circumcision is an elective procedure. Parents should not be coerced by medical professionals to make this choice.

SUMMARY AND RECOMMENDATIONS

Existing scientific evidence demonstrates potential medical benefits of newborn male circumcision; however, these data are not sufficient to recommend routine neonatal circumcision. In the case of circumcision, 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. It is legitimate for parents to take into account cultural, religious, and ethnic traditions, in addition to the medical factors, when making this decision. Analgesia is safe and effective in reducing the procedural pain associated with circumcision; therefore, if a decision for circumcision is made, procedural analgesia should be provided. If circumcision is performed in the newborn period, it should only be done on infants who are stable and healthy.

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