# CIRCUMCISION IN NEWBORNS: RISKS AND BENEFITS

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**DISCLAIMER:** This handout summarizes my own assessment of the risks and benefits of circumcision. It is not official policy of the UCSF Department of Pediatrics or the American Academy of Pediatrics. The only strong feelings I have about the topic are that parents should be provided with accurate information, infants should be provided with good anesthesia, and those doing the procedure should be adequately trained or supervised.

**My bottom line:**

**There are benefits and risks of circumcision. Whatever decision the parents make there is a small chance that they will wish they had made the other decision. If they are uncertain, I'd advise waiting, even though this means forgoing the benefits in infancy and childhood and a higher risk, more expensive procedure if it is done later. This reflects my perspective that errors of commission are worse than errors of omission – "first do no harm."**

* Medical benefits unquestionably exist but are not compelling enough to recommend it routinely in the US. In areas of greater HIV prevalence, medical benefits are greater.
* Medical risks unquestionably exist, but are not compelling enough to recommend against it
* Circumcision leads to permanent loss of the foreskin; for some this is reason enough to oppose circumcisions in newborns, because it happens without the child's consent.
* Circumcisions should not be done without anesthesia
* In March, 2015 the maximum charge for circumcision was $980, but out-of-pocket costs to families are rarely if ever that high; most pay nothing. Patients can call financial counseling at (415) 353-1906 to find out what, if anything, they will be charged.

**Informed consent:**

 Many parents do not base their circumcision decision on consideration of medical risks and benefits. In fact, to quantitatively review the literature on risks and benefits of circumcision with parents would take more time than the procedure itself, would probably not change very many decisions, and might leave them more anxious and dissatisfied.1

For parents who have already decided that they want circumcision, the minimum version of what you need to tell and ask is:

Tell them:

* The main risks are pain, bleeding, infection, and either that they or (later) their son will be unhappy with the result or the decision.

(Write these 4 on the consent form: pain, bleeding, infection, regret.) You can tell them that we do our best to avoid the medical risks, using anesthesia, sterile technique, close supervision, etc. My best guess for the risk of apparent pain with our current system of LMX, sugar water and nerve block, at least when I do or supervise it, is 5 - 10%. If pain appears significant, we give some more anesthetic. My best estimate for the risk of bleeding or infection is somewhere between 1 in 100 and 1 in 1000; see details below. I have heard stories but have no good data on regret.

Ask them:

* Any family history of bleeding disorders? (Write "No FH bleeding" on the consent form.)
* Any questions?

For parents who have already decided they do *not* want a circumcision, there is some debate about whether we should make sure they are aware of the medical benefits they may be forgoing. The AAP 2012 Circumcision Policy Statement2 (which includes a thorough, if not very readable technical report on the topic3) says*, "It is important that clinicians routinely inform parents of the health benefits and risks of male newborn circumcision in an unbiased and accurate manner."* The technical report states, "*Parents … should receive this information from clinicians before conception or early in pregnancy, which is when parents typically make circumcision decisions*." Mothers who have received prenatal care from UCSF will have received a prenatal booklet that provides some basic information on risks and benefits. I generally say something like, "Have you decided whether you want a circumcision for [baby name]? If the response is that they have decided against, I don't discuss it further.

Additional information below is provided for those who want it.

**What are the benefits of circumcision?**

 **Decreased risk of urinary tract infections (UTI)**:

Meta-analyses4,5suggest that circumcision reduces the risk of UTI in the first year by about 85-90%. The *absolute* risk reduction is small, because UTI are uncommon in boys. The risk of UTI over the first year in uncircumcised boys is about 1 to 2%.4,6-9 So 90% reduction would lead to about 1-2 fewer UTI per hundred circumcised boys. There is evidence that the protective effect continues into adulthood, but UTIs become less common and less serious with age and (as discussed below) benefits in adults can be achieved with circumcision later. The cumulative risk of UTI up to age 16 is about 4% in uncircumcised boys and 0.5% in circumcised boys. 5, so the number needed to treat (NNT) to prevent one UTI in childhood is about 30.

Most UTI are easily treated with antibiotics and there is not good evidence that they lead to long-term kidney damage. However, about 1/2 of UTIs in boys in the first year occur in the first 3 months,9-11 when they are complicated by bacteremia in about 10% of cases.11,12 Bacteremia at this age (especially < 1 month) can lead to meningitis and death. Assuming about (50% of 1%=) 0.5% fewer UTI at < 3 months among circumcised boys, this might mean 10% of 0.5%=50 per 100,000 fewer cases of bacteremia, for an NNT of 2000 to prevent 1 bacteremic UTI at < 3 months. If 10% of those bacteremic UTI lead to death or longterm disability, then the NNT to prevent 1 death/disability would be 20,000. This is consistent with data from US Army hospitals from 1980-8513, in which the difference in the incidence of bacteremia in the first month between uncircumcised and circumcised boys was about 80 per 100,000 and the difference in death rates associated with bacteremic UTI was about 5 per 100,000. The decrease in deaths in circumcised boys was not quite significant (my calculations: P=0.07 by Fisher Exact test, based on 0/100,157 vs 2/35,929).

In the PROS febrile infant study, we have a similar result: about an 11-fold increase in the risk of UTI (P < 0.001) and of UTI + bacteremia (P = 0.02) in febrile boys < 3 months old that are uncircumcised compared with circumcised boys.14 An advantage related to this is that in young boys with fever, circumcised boys are less likely to need (or be perceived by their doctors to need) urine samples to rule out a urinary tract infection. Thus the reduced risk of UTI translates into a less invasive work-up when febrile, which benefits a larger number than the number who have a UTI prevented. Infants diagnosed with UTI are sometimes (thankfully, less often than previously) thought to need a voiding cystourethrogram or other imaging to rule out vesicoureteral reflux; so reducing the risk of UTI may translate into fewer such invasive imaging studies.

 **Decreased foreskin problems**: these include phimosis (can't retract foreskin -- normal until puberty, rarely a problem), paraphimosis (when the foreskin gets retracted below the glans, but then gets stuck there (also rare, but a serious problem), and posthitis (inflammation of the foreskin, often accompanied by balanitis (inflammation of the glans), in which case it is called balanoposthitis. Data on the frequency of these is variable because it is unclear at what point a bit of inflammation of the foreskin should be counted. In one study based on parent reporting15 these problems were more common in the first year in circumcised boys (5.5%) than uncircumcised boys (1.1%), but this reversed in older boys, so that by age 8 cumulative rates were 5.6% in circumcised boys vs 17.7% in uncircumcised boys.

A result of clearer clinical significance is the number receiving circumcision later. Circumcisions beyond the neonatal period tend to be done in the operating room, at much greater expense (and greater risk of anesthetic complications) than neonatal circumcisions. For this reason, it is common for elective circumcisions beyond the neonatal period to be done when the child is receiving general anesthesia for some other reason.16 Roughly 5% of uncircumcised boys are later circumcised16,17, about half of the time for medical indications (recurrent balanoposthitis, phimosis, etc.) the remainder because of parental preferences.

**Benefits to adults**:

The adult health benefits are less compelling to me because the man can always decide he wants to be circumcised later if he wants these benefits. (Not many do.)

 **Decreased penile cancer**: Circumcision reduces the risk of penile cancer at least 3-fold18, possibly more19 which otherwise has a lifetime risk of about 1 in 600,20 leading to about 1 cancer case prevented per 900 circumcisions. (Note the AAP 2012 statement confusingly mixes up annual and lifetime incidence and comes up with a much higher NNT). The risk in uncircumcised men appears mainly due to phimosis (inability to retract the foreskin); this might be prevented with better hygiene. The risk of penile cancer is decreasing worldwide for unclear reasons and vaccination against HPV should further reduce the risk.

**Decreased STDs/HIV:**  Randomized trials in Kenya21 and Uganda22 provide definitive evidence of protection of adult men from HIV. In both studies the relative risk reduction was about 50-60% and highly statistically significant (P<0.01); the absolute risk reduction (over 24 months) was greater in Kenya (about 2%) than Uganda (about 1.3%). The AAP review suggests there is also evidence of protection from HSV, HPV and syphilis, but not gonorrhea or chlamydia. It is believed that the inside surface of the foreskin provides a portal of entrance for micro-organisms.

The risk of sexual transmission of HIV in the USA is much lower. In addition, whereas the benefit in adult men in Africa is immediate, benefits of reduced risk of HIV and other STDs from circumcising newborns are decades away. Because of possibilities like an HIV vaccine or changes in the prevalence of risky behavior, it is hard confidently to project the magnitude of these benefits. Investigators at the CDC estimated the NNT to prevent one HIV infection was 298 for all males; it ranged from 65 for black males to 1,231 for white males.23

**What are the peri-operative risks of circumcision?**

Complications of circumcision were recently summarized in a systematic review24 and a more recent US study of 7038 newborns circumcised by hospitalists in two St Louis hospitals25. The study in the systematic review most relevant to UCSF was that by Gee and Ansell26, who reported on 2896 infants circumcised with the Gomco clamp. Circumcisions were done by medical students, housestaff, or attendings; proportions of each group aren't provided but it was at a teaching hospital (University of Washington). This was an old study; presumably no anesthesia was used. I'll focus on that study and the St Louis study here; in 4 smaller studies in the systematic review which the Gomco clamp was used in a total of 1895 newborns, adverse events were reported in 0.3-2%, none of them serious.

**Excessive bleeding,** defined as instances 4-72 hours after circumcision in which a note in the chart indicated that the physician had done something to stop the bleeding occurred in 29 (1.0%) of the circumcisions in the Gee and Ansell study. Most commonly bleeding was stopped by applying a gauze sponge soaked in 1:1000 aqueous epinephrine. In the St Louis study two infants had emergency department visits for mild bleeding and two infants required transfusions for bleeding; both of the latter were sick infants circumcised in the NICU. My own experience over hundreds of circumcisions has included a handful that needed some Gelfoam to stop bleeding; none has needed a transfusion or suturing.

The next most common complication reported by Gee and Ansell was **dehiscence**, occurring in 8 infants, described as complete separation of the penile skin from the mucous membrane in (0.2%). In any case, these were all uneventfully repaired by suturing. This complication was not reported by Srinivasan et al., and I have not seen it and am having trouble picturing it.

**Infection**, diagnosed by pus and erythema at the site of the circumcision, occurred in 4 (0.14%) circumcisions in the Gee and Ansell study; all were treated topically . (Infections were more frequent and more serious with the Plastibell device.) No significant infections were reported in the St. Louis study.

**Denudation of the penile shaft** was reported by Gee and Ansell in 3 patients; 2 re-epithelialized spontaneously and another received an operation using scrotal skin. This was not reported by Srinivasan et al.

**Injury to the glans** occurred in 1 patient in Gee and Ansel's study at the time of the dorsal slit. There was no urethral injury and it healed spontaneously. One infant reported by Srinivasan et al also had a 2-3 mm laceration of the glans that did not require suturing.

**Adverse effects of analgesia/anesthesia:** Not reported in either of the two studies above, but a little bleeding and bruising at the lidocaine injection site is common. There is a case report of seizures in a preterm baby following lidocaine anesthesia for circumcision27, but it does not indicate how much lidocaine was administered. We use SweetEase, a 24% sucrose solution that helps quiet babies; I hope we are not programming them to like sweets.

**What are later risks/complications of circumcision?

Poor cosmetic result/need for revision:** The study by Srinivasan et al included a systematic search for urology visits for late complications of circumcisions. Complications requiring a corrective procedure occurred in 1.1% of babies circumcised in the NICU/SCN compared with 0.21% of those circumcised in the well baby nursery. The most common reasons for a corrective procedure were **redundant foreskin/adhesions** (presumably insufficient foreskin was removed and the remaining foreskin stuck to the glans), **entrapped penis** (in which the circumcision wound closes around the penis; risk is increased if there is a large suprapubic fat pad) and need to divide **skin bridges**, where penile shaft skin sticks to the glans (type "skin bridges circumcision" into Google images to see photos). Note both redundant foreskin and entrapped penis were also sometimes treated with (presumably topical) steroids.

**Later unhappiness with parents' decision:** An additional risk is that the son may be unhappy with the decision the parents are making on his behalf. While this could happen regardless of what decision they make; the decision not to circumcise can be reversed when their son is old enough to decide for himself. The National Organization of Circumcision Information Resource Centers (Google NO-CIRC) has a referral service for men who want to get foreskin reconstructions, but this is obviously less satisfactory. Opponents of circumcision consider it genital mutilation and regularly demonstrate at American Academy of Pediatrics national meetings (see photo from San Diego, 2014). Many thoughtful people have reservations about the ethics of the procedure. 28,29

**Meatal stenosis:** This is a narrowing of the urethral meatus that obstructs the flow of urine. It is reportedly much more common in circumcised boys. Van Howe30 reported its occurrence in a consecutive sample of boys <18 years old seen in a primary care practice for well child exams, sports physicals, and sick visits where a genital exam was indicated. (The proportions of these visits types were not provided.) He diagnosed meatal stenosis if boys had symptoms consistent with meatal stenosis, such as dysuria, voiding complaints, stream abnormalities, or abdominal discomfort and a meatal opening 2 mm or smaller. He reported no occurrences of meatal stenosis among 91 uncircumcised boys and 28 cases among 1009 circumcised boys (2.8%), and wrote that “nearly all required meatotomy to resolve their symptoms.” This risk seems high to me, and I am concerned about the number who may have presented for well care and been referred for what may have been very mild symptoms. The author is a strong opponent of circumcision whose credibility is eroded by having disputed protection against HIV and UTI.31,32 However, I could not find better data on this.

**Decreased sensation/sexual functioning:** The effect of neonatal circumcision on sexual satisfaction is hard to study, but opponents of circumcision point to the functions of the foreskin in facilitating sexual activity and increasing sexual pleasure. Surveys comparing sexual satisfaction between circumcised and uncircumcised men do not yield consistent differences33, but there was a slight difference in self-reported sexual satisfaction in favor of the uncircumcised group in one of the African randomized trials 34, in which after 2 years the percent not satisfied with sex was 0.1% in the control group and 1.6% in the circumcision group (P=0.004). Although this P-value is significant, it resulted from satisfaction improving in the control group, rather than decreasing after circumcision. On the other hand there was a large increase in sexual satisfaction among female partners of men circumcised in that trial, with 40% reporting an improvement and only 3% reporting a worsening.35) Available data do not suggest a big effect on sexual functioning, but it is hard for me to argue with (male or female) opponents of circumcision who report they personally derive great pleasure from the foreskin. In addition, it seems likely that men who felt their foreskin was important for sexual pleasure might have been less likely to consent to be in a randomized trial of circumcision, again making it more difficult to generalize this result to the effects of circumcising newborns.

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