

## Male Neonatal Circumcision - A Review Article

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### ABSTRACT

Circumcision is the most common surgery performed worldwide and about 30% of men are circumcised, of whom 70% are Muslim. The majority of male neonates are circumcised based on religious and cultural practices. Neonatal circumcision has several advantages when compared to an older age group receiving the procedure. There is considerable controversy about circumcision – neonatal or otherwise. The clinical benefits of circumcision include reducing the risk of urinary tract infection (UTI), sexually transmitted disease (STD), HIV infection, phimosis, balanitis and penile cancer. The most common complications of circumcision are infection, bleeding and failure to remove enough foreskin. These complications occur in less than 1% of all performed circumcisions.

Neonatal circumcision is a simpler procedure than adult circumcision and has very low rates of complications when performed by an experienced physician on healthy newborn infants. Healing is usually complete within a week. Local analgesia should be administered to all infants undergoing the procedure. Circumcision should be delayed on babies born with congenital anomalies of the penis or if there is the slightest doubt about baby's health. When parents are making a decision about circumcision, they should be informed about its medical advantages and disadvantages. Key to the ethical discussion is respect of parent's religious, ethnic or cultural beliefs for which circumcision is practiced.

**Keywords:** Neonates, Circumcision, Benefits, Risk

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### 1. Introduction

Circumcision (in Latin *Circumcido*, to cut around) is one of the most common surgical procedures performed on males, in which the foreskin (prepuce) of the penis is removed. The origin of circumcision came from ancient Egypt, which was performed to improve male hygiene. Then, religious circumcision was part of Abrahamic covenants with Jehovah. Religious male circumcision is considered a Commandment from God in Judaism but in Islam, it is considered to be a Sunnah (1). It is also custom-

ary in some Christian churches and it became popular in western cultures in the mid-19th century as a preventive health measure (2, 3). In the present article, we review the timing, indications, benefits, complications, controversies and other aspect of neonatal circumcision.

### 2. Historical Perspective and Epidemiology

An estimated one million circumcisions are performed each year in the United States. The prevalence of circumcision has increased from 34% in 1932 to 60% in 1935. In 1960,

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more than 80% of men in United States were circumcised. However, after 1970, when the American Association of Pediatrics (AAP) stated it was not a medical necessity (4), the prevalence started to decrease, and in 1992, it was estimated that only 77% of men were circumcised. Despite AAP policy, according to the World Health Organization (WHO), about 30% of men are circumcised, of whom 70% are Muslim (5, 6).

### 3. Controversies

Currently, there is controversy regarding circumcision. Some "clinical benefits" lauded by advocates of circumcision include reducing risk of urinary tract infection, phimosis, genital cancer and sexually transmitted infections (7), but those raised by opposition of circumcision include surgical pain, post-surgical complications and violation of human right (8).

### 4. Timing of Circumcision

Neonatal circumcision is performed on healthy term infants who are at least 24 hours old, and preferably less than 10 days of age.

Circumcision during infancy, particularly in the neonatal period, has some advantages including low frequency of complications due to the simple nature of procedure and the healing capabilities of the newborn. Another major advantage is that suturing is not usually necessary if the procedure was done in the neonatal period as compared to the post-neonatal period. One study in the US found that no complications were seen with circumcision in first month of life, but significant post-operative bleeding was seen in 30% of infants aged 3 to 8.5 months (9). Another study showed that painless circumcision is possible in almost all newborns if it is performed during the first week after birth (10).

### 5. Contraindications

The major contraindications of neonatal circumcision are premature infants (< 37 weeks gestation) who are not ready for discharge from the nursery, neonates with congenital anomalies of the penis and bleeding diathesis (11). Circumcision should not be performed until at least 12 to 24 hours after birth to ensure that the infant is stable and complete physical adaptation to extrauterine life has occurred. Infants with the family history of blood dyscrasia or evidence of petechial lesions should be evaluated prior to circumcision. Those with hypospadias should not be circumcised because the foreskin is frequently used in reconstruction.

### 6. Indications and Benefits

Although the majority of male neonates are circumcised based on religious and cultural practices, and not for medical reasons, circumcision has been associated

with numerous medical benefits other than those that are discussed here.

#### 6.1. Urinary Tract Infection

Uncircumcised male infants younger than six months of age, due to physiologic adhesion (phimosis), have higher risk of developing UTI than circumcised male infants but after six months of age, this association is not seen (9, 12). A large prospective study in Iran showed that neonatal circumcision reduces the incidence of asymptomatic urinary tract infection (13).

Although it is estimated that uncircumcised infants are at risk of urinary tract infection 3 to 20 times more than circumcised ones, the absolute risk is 1%. To extrapolate, that means that 100 to 200 cases of circumcisions should be performed in order to prevent 1 case of UTI. For this reason, both AAP and AMA do not recommend circumcision as a method for preventing UTI (14, 15). But it is also noted that in infants with vesicoureteral reflux and prenatal history of hydronephrosis, circumcision provides significant protection against UTI, 19% versus 3% in circumcised than uncircumcised male infants, despite each group being on prophylactic antibiotic therapy (16, 17).

#### 6.2. Phimosis

Phimosis refers to any condition in which the foreskin cannot be retracted. In true phimosis, cicatrices scarred tissue is present at the preputial ring and the symptoms are irritation of the skin, dysuria, bleeding and occasionally urinary retention. A retrospective survey study showed phimosis was significantly lower in the circumcised boys (18). For this condition, circumcision is a preventive and curative treatment (14, 15).

#### 6.3. Penile Cancer

The incidence of squamous cell cancer of the penis is less than 1 per 100,000 male; the risk is increased to three- to six-fold in uncircumcised men. There is a large variation in the incidence of penile cancer among countries where most men are uncircumcised. The studies estimate that 600 to 900 circumcisions are needed to prevent one lifetime case of penile cancer. The AAP states that neonatal circumcision has some protection from penile cancer if it is performed in early infancy, but both of AAP and AMA note the penile cancer is rare disease and circumcision should not be recommended as a preventive measure in this regard (14, 19).

#### 6.4. Cervical Cancer in Partners

Cervical cancer is less common in sexual partners of circumcised men. This reduction of cervical cancer has been documented by some studies (20, 21) however other studies have had conflicting results (4, 22). In summary, there is insufficient evidence to support an association be-

tween circumcision status and the risk of cervical cancer.

### 6.5. Sexually Transmitted Infection

There is strong evidence that circumcised men were somewhat less susceptible to HIV infection and other STDs (HPV, HSV, trichomonas but not gonorrhea or syphilis) than were uncircumcised men (23, 24). Most of the studies on the relationship between acquiring HIV and being circumcised have been conducted in developing countries, Africa in particular. A randomized trial in South Africa demonstrated the risk of acquiring HIV infection was up to 60% higher in uncircumcised men (25). It is crucial to remember that circumcision only decreases the risk of acquisition, but not the transmission of HIV infection (26). Although most of studies showed a positive relationship between circumcision and STD prevention, routine circumcision cannot be recommended as a preventive measure for STDs.

### 6.6. Good Hygiene

Good penile hygiene in uncircumcised infants can be difficult and circumcision prevents many problems with the foreskin (27).

## 7. Risks and Complications

As with any surgical procedure, circumcision may lead to complications, which range from minor to severe. The median frequency of any complication is 1.5% (range 0.1-35%) (4, 7, 9, 28, 29). The majority of complications are bleeding, local infection, followed by unsatisfactory cosmetic results (insufficient or excessive foreskin removal). The wide variation in rates of complications is likely due to various factors such as age at the time of circumcision, expertise of the health care provider and the sterility of conditions under which the procedure was performed (30).

### 7.1. Bleeding

Bleeding is the major complication of circumcision (4). It occurs from injury to frenular artery or dermal cut edge, although in most of the cases bleeding is minimal and can be controlled by compression. However, if bleeding continues or a hematoma is formed, it is necessary to suture the specific bleeding vessel or explore the wound. It is critical to take family history of bleeding disorders into account before considering the procedure. The study showed no difference in the risk of bleeding based on technique chosen to perform the circumcision (31).

### 7.2. Infection

Infection of the fresh circumcision wound has been a fairly common complication. It is usually mild and caused by a local inflammatory change, which resolves with topical antibiotic. Good postoperative care to pre-

vent infection and prophylactic antibiotics are not indicated but when infections occur, it should be diagnosed and treated promptly because the immune system in newborns is relatively compromised and untreated infections can cause serious problems. (9, 28, 31-33).

### 7.3. Meatal Stenosis

Meatal stenosis or urethral stricture is a narrowing of the opening of the urethra at the external meatus and is an uncommon complication of circumcision. It likely occurs in response to chronic irritation of the meatus and may be a longer-term complication of circumcision. Meatal stenosis does not require treatment, but in a more severely affected infant, in whom deflection of the urinary stream, dribbling of urine, dysuria or urinary frequency occurs as a result of stenosis, meatotomy may be recommended after pediatric urologic consultation (11, 34). Topical use of a lubricant jelly after circumcision in boys may reduce the risk of meatal stenosis (35).

### 7.4. Meatitis

Erythema and inflammation of the urethral opening is known as meatitis. It is a common post circumcision finding, but usually resolves as the epithelial surface of the glans thickens in response to irritation. Dressing with petroleum jelly or antibiotic ointment is a technique to minimize irritation and prevent this problem (4).

### 7.5. Insufficient Foreskin Removal

If insufficient foreskin is removed, the resulting appearance may be unacceptable and these cases should be referred to pediatric urologist to determine the need for circumcision revision. Some authors report that 0.5% of boys required a procedure to revise the circumcision (36).

### 7.6. Excessive Foreskin Removal

If the glans is inadequately separated from the inner prepuce prior to excision, it is possible to draw skin from the penile shaft up into a circumcision device and remove more. Excessive foreskin removal may result in a denuded penile shaft. In many cases conservation therapy results in adequate healing by secondary intention (36).

### 7.7. Phimosis

Circumcision can cause pathologic or secondary phimosis (an inability to retract the foreskin), especially when it is performed on a boy with a penile web or buried penis, the circumferential edge can pull together in purse-string fashion and result in the penis being trapped under circumcision site. Closely monitoring and waiting is sufficient in some cases but surgical correction may be necessary in others (4).

### 7.8. Skin Bridges

Skin bridges are formed when remaining parts of the foreskin fuse to other parts of the penis (often the glans). They are thought to arise from an area of minor injury on the edge of the glans. This can result in pain during erections and minor bleeding if the shaft skin is forcibly retracted. Due to abnormal adherence to the circumcision edge, in this condition, excision may be required (4).

Other complications such as concealed penis, urinary fistulas, chordee, cysts, ulceration of glans, necrosis of all parts of the penis, hypospadias, and epispadias are preventable with good medical care as these complications usually occur at the hands of inexperienced practitioner. Although death is rare, death rate is estimated to be one out of 500,000 cases of circumcision (36-38).

### 8. Sexual Effects

The impact of circumcision on penile sensation or sexual satisfaction has not been systematically reviewed and remains unclear. Some studies suggest that the end of the penis is less sensitive when the foreskin is removed and sexual sensation may be decreased (39). However, other studies found no difference between the two (40). There was no significant change in sexual satisfaction and sexual function (41).

### 9. Pain Control During Circumcision

"Neonates, just like adults, do feel pain". Newborns experience pain during circumcision and evidence of the need for pain control is strong. Although anesthesia was not provided in the past, safe and effective methods of pain control exist and should be provided to all infants undergoing the procedure (41, 42). Methods of anesthesia include the topical eutectic mixture of local anesthetic (EMLA), the dorsal penile nerve block (DPNB) using 1% lidocaine, and the ring block. However, current data provides sufficient evidence to recommend the routine use of EMLA for circumcision pain in settings in which no analgesia are routinely administered (43). Swaddling, oral sugar solutions or acetaminophen may be given, but should not be used as the primary method of pain relief. After infancy, the procedure usually requires general anesthesia.

### 10. Methods for Neonatal Circumcision

There are four techniques for neonatal circumcision: the dorsal slit method, the Plastibell method, the Mogen clamp method and the Gomco clamp method. The use of Clamp is associated with less pain, no or minimal bleeding and greater protection of the glans. The Plastibell method is widely used around the world and has been acceptable in developing countries. However, the use of incorrect techniques can cause many complications. This method is recommended for areas where the practice of

circumcision is routine. The Mogen clamp is used widely in North America and its complications in neonates are less frequent than other methods. Unlike the Plastibell, the clamp is reusable and precautions are needed to ensure sterility. The Gomco clamp has different bell sizes and so is suitable for children of different ages (6).

### 11. Final Decision

Making the decision for circumcision can be problematic for some parents, who may be concerned about its benefits and potential for harmful effects. Other parents have no difficulty in making a decision because of cultural or religious rules that require circumcision. Parents who choose to have their baby circumcised should be encouraged to seek out an experienced practitioner.

### 12. Conclusion

Male circumcision is one of the oldest and most common surgeries performed in the world and the majority of male neonates are circumcised based on religious and cultural practice, not for any medical reasons. The clinical benefits of circumcision include reduced risk of UTIs (especially in early infancy), STDs including HIV, phimosis and penile cancer. The most common complication of circumcision are infection, bleeding and failure to remove enough foreskin. In general, complications are minor and treatable, but a high frequency of complications are seen when the procedure is undertaken by inexperienced providers, non-sterile environments or with inadequate equipment and supplies. Thus, we recommend to parents that they should find an experienced practitioner.

To summarize, neonatal male circumcision is generally a rapid and safe procedure when performed in clinical setting under aseptic conditions by experienced practitioner.

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