

Strategies for Holistic Care in Neonatal Male
Clients Undergoing Circumcision

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Abstract

Male circumcision is a controversial medical procedure routinely practiced in the United States. Once performed only as a religious act, this minor surgery became fashionable in the late nineteenth century. In modern society, circumcision remains popular, but the medical community continues to debate its necessity. Perhaps a larger debate concerns the use of anesthetics and analgesics in circumcision. Infants do feel pain, and pain relief measures are imperative during this procedure. Several effective methods have been established, and practice must accommodate the updated evidence. If pharmacologic and non-pharmacologic measures are employed appropriately, neonatal circumcision can be performed with minimal trauma to the infant. This knowledge is vital for nurses, who will be responsible for providing many of these essential interventions.

Strategies for Holistic Care in Neonatal Male Clients Undergoing Circumcision

Male circumcision is the surgical removal of the foreskin of the penis, and many peoples and tribes have performed it with many different motivations for thousands of years. However, the Jewish tradition of circumcision is the most well known. The first mention of circumcision in the Bible is associated with God's promise that Abraham's descendants would become a great nation. Abraham and his descendants were to be circumcised as an outward sign of their inward obedience in keeping their promise to God. Circumcision became part of the Law of Moses, but it was made clear that circumcision was not sufficient for salvation. Circumcision was also debated by the early Christians, as some Jewish believers thought that Gentiles who became saved should follow all Jewish rituals, including circumcision. Paul disagreed, believing that Gentiles could become *new* men without being circumcised, and could participate fully as children of God without the Jewish ritual ("Circumcision," 2010).

Orthodox Jews still practice traditional circumcisions, called a *Brit milah*, on the eighth day of life. These procedures are generally performed by a *mohel*, who may or may not be formally trained, but is often taught by his predecessor in the equivalent of an apprenticeship. These circumcisions are performed without anesthesia in a ceremony that represents the infant's inclusion in God's covenant with the Jews. All Orthodox Jews are to have their male infants circumcised on the eighth day of life to be in compliance with Jewish law. The ceremony must occur on the eighth day of life unless medical problems prevent this from occurring. The only infants entirely exempt from the procedure are those whose mothers have already had two infants die because of the procedure. This

rule prevents infants with hereditary hemophilia from hemorrhaging due to circumcision (Werblowsky & Wigoder, 1997).

Although the religious significance of circumcision is not particularly important in American culture, circumcision is a very common practice in infants in the United States. In fact, neonatal male circumcision is currently the most commonly performed surgical procedure in the United States (Wang, Macklin, Tracy, Nadel, & Catlin, 2010). Circumcision's rise to popularity in the United States began in 1870, when Dr. Lewis Sayer posited that uncircumcised male children were at greater risk for communicable diseases, psychological problems, neurovascular disorders, and death. He came to this conclusion after noticing that performing a circumcision cured nearly every one of his male pediatric patients of their various ailments. Thus, many physicians drew the conclusion that the foreskin was a cause of nervous irritation, which in turn was responsible for the vast majority of illnesses. Rather than waiting to use circumcision as a treatment for disease, many parents began choosing to have their sons circumcised to prevent the onset of disease. Once the idea that the foreskin could cause disease was planted in the minds of the people, lack of circumcision became associated with filth and low socioeconomic status. By the end of the nineteenth century, nearly everyone who could afford to do so chose to have their male infants circumcised, for health reasons as well as aesthetic and cultural ones (Gollaher, 1994).

Controversy

Risks and benefits. Circumcision remains a common practice in male infants in the United States, yet there is controversy over whether it is medically necessary.

Although it is not often viewed as a major procedure, circumcision is surgery and

therefore carries risks. The most common health risks associated with circumcision are very minor and include prolonged bleeding and infections at the circumcision site (Steadman & Ellsworth, 2006). One study attempting to determine the cause of Methicillin-Resistant Staphylococcus Aureus (MRSA) infections showed that the circumcision equipment in several newborn nurseries was more contaminated with bacteria than any other part of the nursery. Cases of MRSA, impetigo, and other infections have been linked to improperly sanitized circumcision restraint boards and equipment (Van Howe & Robson, 2007).

Other risks of circumcision include meatal stenosis, a narrowing of the meatal opening. This may cause minor issues such as urinary stream deflection, or it may cause more major issues, such as painful urination, hematuria, and abdominal pain. In severe cases, a meatotomy may need to be performed to widen the meatus (Van Howe, 2006). Steadman and Ellsworth also suggested that a minor risk of circumcision may be unattractiveness of the genitalia due to imperfect surgical skill (2006).

Although such cases are rare, more serious complications of circumcision have been reported. One such complication is the accidental creation of a urethral fistula, meaning that another exit is made from the urethra, allowing urine to be expelled from the penis in more than one place. This requires a urethrostomy to close the second opening. Another potential complication of circumcision is permanent damage to the glans and frenulum. Hemorrhage is a very small risk in healthy infants, but when it occurs it is very serious. In some infants with hemophilia, a disorder that prevents blood from clotting appropriately, circumcision may be the first time an infant bleeds and therefore the event that causes the disorder to be discovered. This condition actually

prompted the addition to the Talmud regarding circumcision in families in which multiple infants had died due to hemorrhage at circumcision. One extraordinarily rare complication is accidental amputation of the glans or the entire penis during the procedure. Finally, there is a danger that if the newly circumcised penis became infected, it could become gangrenous and require amputation, or the infant could become septic and possibly fatally ill. Due to advances in antibiotic therapy, this is unlikely, but not entirely impossible (Steadman & Ellsworth, 2006).

Complications can also arise in infants who are receiving medications such as anticoagulants, which prevent effective clotting and can increase bleeding risks. Particularly in premature infants, physicians performing circumcisions should be aware of what medications are being used in the baby's therapy. Persistent Pulmonary Hypertension (PPHN) occurs when the pulmonary vasculature fails to relax in the days following birth. Instead of the normal decrease in pulmonary vascular resistance (PVR), the PVR remains high and can cause right-to-left shunting in the heart through a patent ductus arteriosus (PDA) or through a patent foramen ovale. This does not allow adequate oxygenation. Sildenafil, more commonly known as erectile dysfunction drug Viagra, causes relaxation of the blood vessels in the lungs, and has been used for PPHN in infants with tremendous success. However, the drug does still perform its intended action in causing penile vasodilation and erection. Therefore, circumcising these infants can result in bleeding that is not controllable by usual means, as erection can cause the skin to separate from the mucosa in fresh circumcisions. This complication is specific to infants receiving Sildenafil, but it is serious and may require a trip to the operating room for

cauterization, which carries its own risks. The best option is probably to withhold circumcision until this treatment has been completed (Gamboa, Robbins, & Saba, 2007).

Many have also claimed that there is a risk of difficulty with breastfeeding and even lower lifelong intelligence in circumcised infants. These anti-circumcision proponents have posited that the procedure is associated with poor development and shorter maintenance of breastfeeding. A longitudinal study by Fergusson, Boden, and Horwood (2008) determined that this is a myth. The researchers analyzed this claim by examining how well and how long babies breastfed who were circumcised versus those who were not. They also studied the babies to determine if the cognitive ability and health outcomes associated with breastfeeding would be affected by the infant's circumcision status. The results of the study showed that there was no difference whatsoever in quality or length of breastfeeding between those who were circumcised and those who were not. The cognitive abilities and overall health of the babies also were not affected by circumcision status.

Although there are certainly potential complications and risks associated with neonatal male circumcision, there are also some unfounded arguments causing undue fear of the procedure. Due to the scientifically proven risks, however, circumcision should not be undertaken lightly. It is an unpleasant procedure with a potential for severe complications. On the other hand, numerous studies have shown that there are, in fact, medical benefits derived from circumcision, including reduced occurrence of urinary tract infections, penile cancer, and sexually transmitted diseases. Urinary tract infections are approximately ten times more likely in uncircumcised infants than in circumcised infants in the first year of life, and uncircumcised males remain three times more likely

than their circumcised counterparts to contract urinary tract infections in adulthood.

Penile cancer can also be almost eradicated by neonatal circumcision, although poor hygiene has been implicated as the major cause of penile cancer in uncircumcised males. If the foreskin is not retracted fully for sufficient and frequent cleaning of the glans, penile cancer is much more likely. Obviously, complete removal of the foreskin makes adequate hygiene more easily achieved. Men circumcised in infancy are significantly less likely to develop penile cancer than uncircumcised men or men circumcised later in life (Steadman & Ellsworth, 2006).

Sexually transmitted diseases are less likely to be spread by circumcised males as well. Genital warts, in particular, are often not spread by circumcised males because they notice the lesions sooner. In uncircumcised males, genital warts often multiply beneath the prepuce initially, making them less visible. The virus may be spread to a partner or partners before the individual ever realizes that he is infected. Human Immunodeficiency Virus (HIV) also has significantly reduced rates of transmission in males who have been circumcised. In fact, uncircumcised males are at a two to eight times higher risk of contracting HIV from an infected partner. As with penile cancer, however, the circumcision must occur in infancy for the protective benefits to exist. Researchers do not fully understand why this may be, but the results are well established. Finally, Human Papilloma Virus (HPV) transmission was significantly decreased in circumcised males involved in high-risk sexual behaviors, as was cervical cancer in their female partners. In the general population, circumcision did not have as dramatic an effect on the rate of HPV and cervical cancer, but there was still a definitively lower rate of those diseases in circumcised males and their sexual partners (Steadman & Ellsworth, 2006).

One other benefit of circumcision cited is the correction of phimosis, a tight, unretractable foreskin. However, nearly every male infant is born with some degree of physiologic phimosis, and this is neither dangerous nor in need of immediate repair. Although circumcision does provide immediate relief of phimosis, the researchers suggest that circumcision should not be performed solely for this reason. The decision to circumcise based on phimosis should not be made until a pediatric urologist has seen the child to determine if the phimosis causes difficulty with urination or is pathologic in nature. When phimosis does indicate surgical treatment, there is debate about whether a full circumcision should be performed, or simply a dorsal slit (Steadman & Ellsworth, 2006).

There are many who consider circumcision to be a dangerous and painful operation with no purpose other than aesthetics. Some argue that due to the irreversibility of circumcision, it constitutes permanent disfigurement without the individual's informed consent (Benatar & Benatar, 2003). While the American Academy of Pediatrics has acknowledged that there are health benefits associated with circumcision, they have chosen not to recommend it as a routine procedure. However, they have not condemned the practice or suggested that the risks might outweigh the benefits. Routine circumcision of infant males seems to fall into a moral and medical *gray area*, and the issue is still hotly debated in the medical community. It is clear that those passionate about either position, to circumcise or not to circumcise, may make claims that are not based on sound evidence. Significant research into circumcision itself and into viable alternative options is important both for parents of infant males and for

nurses who may provide education to those parents. Religious and cultural beliefs about circumcision should also be taken into consideration (Steadman & Ellsworth, 2006).

Timing of circumcision. Once the decision has been made to have circumcision performed, it is important to consider when the circumcision should be performed. In American hospitals, circumcision is generally performed the day after a baby boy is born. This is based more on convenience than on medical research, however. Since obstetricians are generally responsible for performing circumcisions, it is logical to perform the circumcision while the mother and infant are both still in the hospital. Circumcision may not be performed at this time if the infant is not medically cleared due to anemia or other conditions. Additionally, members of certain religions may not want their children to be circumcised at this time. Jews, for instance, prefer to have their infants circumcised in the *Brit Milah* ceremony by a *mohel* on the eighth day of life in accordance with Talmudic law. Some sects of Muslims may choose to circumcise their children in the preschool years or in adolescence. Acceptance of cultural differences in the practice of circumcision is essential (Paulose, Hart, & Rauch, 2008).

Although millions of infants have undergone circumcision the day after birth without incident, it is arguable that the eighth day after birth is the most appropriate time to circumcise. The Jews have practiced eighth day circumcision for centuries because that is the day that God commanded it be done. However, it is also the day in which the infant is least likely to experience bleeding complications. In their book, McMillen and Stern (1984) explored the medical benefits of circumcising on the eighth day of life. At birth, infants are born deficient in Vitamin K because it does not cross the placenta easily. Breastfeeding also generally does not supply infants with a great deal of Vitamin K. This

is medically significant because Vitamin K is so important in the blood's ability to clot, and this is why almost every infant born in the United States is given an intramuscular dose of Vitamin K at birth. Vitamin K assists in the production of prothrombin, an essential element of the clotting cascade. Up until the seventh day of life, these authors concluded that prothrombin is at a sub-normal level in the body. On day eight, however, their research showed an excess of prothrombin in the infant male's body—an excess which never occurs again. Thus, there appears to be both Scriptural and medical support for eighth day circumcision.

How to perform circumcision. Another matter of intense discussion is the provision of analgesia and anesthesia to infants whose parents have chosen circumcision. There are arguments for and against the use of any anesthesia whatsoever, and even more arguments over which anesthetics and analgesics are most effective. For many years, the prevailing belief was that infants could not feel pain due to their immature nervous systems. The crying and changes in vital signs associated with circumcision were thought to be caused by the positioning and restraints employed during the procedure. However, advances in research methods and medical knowledge have demonstrated that infants do, in fact, feel extreme discomfort during the circumcision procedure (Anand, 2008; Porter, Porges, & Marshall, 1988; Williams, 2003).

Anesthesia and Analgesia

Importance. Contemporary research has shown that infants do feel pain and do need pain medication and adequate comfort measures when undergoing circumcision. It is vitally important to manage the pain of newborns and children because traumatic pain experiences in infancy can have far-reaching effects on pain processing, development,

and response to future stress. Longitudinal studies have shown that boys who did not have their pain managed adequately during circumcision have higher levels of stress and pain responses to immunizations, other painful medical procedures, and any painful events (Anand, 2008). One of the most important roles of a nurse is that of an advocate for her patients. This is especially important when the patient is an infant incapable of advocating for himself. Nurses must maintain a current knowledge base to ensure evidence-based practice and the best possible patient care. Both non-pharmacologic and pharmacologic measures have been researched in the provision of adequate pain management. Although some of the pharmacologic means of analgesia require administration by physicians, there are also effective non-pharmacologic options available. Nurses should strive for policy changes to incorporate the latest evidence on these options (Stang, et al., 1997).

Nonpharmacologic measures. Nonpharmacologic comfort measures should be employed first to reduce the stress and discomfort associated with preparation for circumcision. One intervention that can prevent distress before the procedure even begins is placement in a cushioned circumcision restraint chair rather than on a rigid, molded plastic board (Circumstraint); (See Figures 1-3). The newly designed circumcision chair is an improvement from the Circumstraint in several ways. All points of contact between the infant and the chair are padded, while the Circumstraint board has no padding. It can also be adjusted to the size of the infant, whereas the Circumstraint is rigid, and the same size is used for all infants. Another advantage is that it allows infants to retain the ability to move the extremities without compromising the sterile surgical field. Last, the circumcision chair holds infants in a better position than the Circumstraint

allows. They are seated with heads elevated 30 to 45 degrees, knees flexed, and hips abducted – a natural and comfortable position that still allows easy access to the surgical site. Other nonpharmacologic comfort measures easily available to nurses include swaddling the arms, providing a pacifier, and avoiding placement on the Circumstraint or circumcision chair too long before the procedure begins (Stang, et al., 1997).

Pharmacologic measures.

Overview. Pharmacotherapy is also a vital part of providing sufficient pain management to infants undergoing circumcision. The main forms of anesthesia for circumcision are dorsal penile nerve blocks, ring blocks, caudal blocks, topical creams, and oral sucrose. Each has its own advantages and disadvantages. The common factor is the use of lidocaine in nearly all of these procedures. Lidocaine is a local anesthetic from the amide family which is available in preparations for topical use and for injection. It produces an anesthetic effect by blocking sodium channels to prevent conduction of impulses along the axons. Although other numbing agents are occasionally used, lidocaine is the local anesthetic of choice for circumcision and most other minor procedures due to its rapid onset, effectiveness, and low risk of allergic reactions (Lehne, 2007).

Dorsal penile nerve block. The first option is the dorsal penile nerve block. In this procedure, the infant is placed in a supine position and secured in the circumcision board or chair such that his limbs are immobilized and his genitals exposed. The penis and scrotum are cleaned with povidone iodine solution, and a sterile field is created around the penis. Then small amounts of lidocaine are injected directly under the skin to

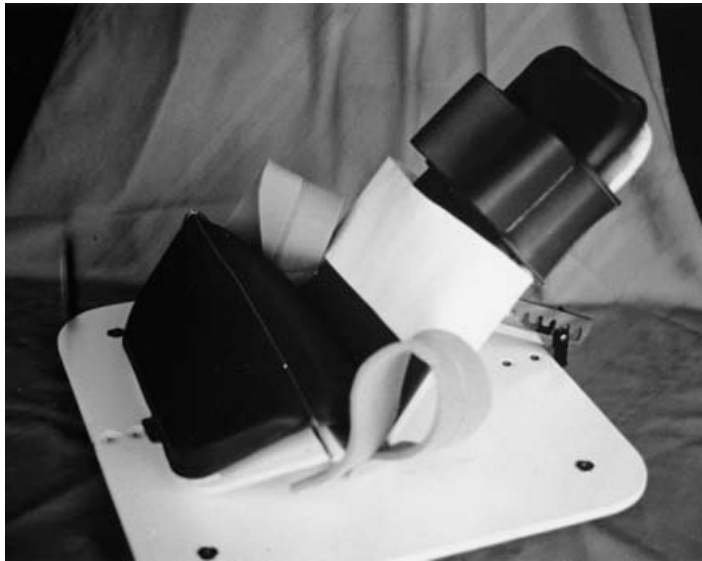


Figure 1. Circumcision Restraint Chair. This newly designed chair allows the infant to be positioned more naturally, adequately exposes the surgical site and allows maintenance of sterile field.



Figure 2. Infant in Circumcision Restraint Chair. This image demonstrates proper positioning in the chair.



Figure 3. Infant on Circumstraint Board. The Circumstraint board effectively exposes the genitalia, but forces the infant into an unnatural position.

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(Stang, et al., 1997)

numb the area for deeper injections into either side of the shaft's midline. After aspirating to ensure that the needle is not in a blood vessel, lidocaine is injected into the fascia near each dorsal nerve root to numb the shaft of the penis distally. This procedure is relatively easy to perform, and it does not require the addition of more than a few minutes to the length of time the circumcision takes. The most likely side effect is bruising, and the dorsal penile nerve block has been proven safe and effective for anesthesia during circumcision (Shlamovitz, 2008).

Ring block. The ring block requires the same patient positioning as the dorsal penile nerve block, and also utilizes lidocaine. For this procedure, lidocaine is injected in small amounts in a ring—all the way around the shaft of the penis, approximately halfway between the base and head (Buyukkocak et al., 2005). The concept is the same as that of the dorsal penile nerve block, in that the lidocaine blocks impulse conduction distal to the injection site, numbing the head of the penis before the circumcision is performed. This procedure can also be performed very quickly and still be effective. When properly performed, it is not particularly painful, and it provides excellent relief of the pain associated with circumcision (Buyukkocak, et al., 2005).

Caudal block. Caudal blocks are somewhat different from the other two because of the location in which they are given. In infants, caudal blocks require lateral positioning. Using sterile technique, Lidocaine or Bupivacaine is injected through the sacral hiatus into the caudal epidural space, the lowest accessible point in the epidural system. Bupivacaine shares the same mechanism of action as lidocaine, but its effects last for two to four hours, while lidocaine is only effective for half an hour to an hour (Lehne, 2007). Side effects of the caudal block include infection at the injection site if

proper technique is not utilized, urinary retention, bruising, accidental intraosseous administration, or accidental dural puncture (“Caudal block,” 2005).

Although caudal blocks may be used in older males during circumcision, this method is rarely employed in neonatal circumcision because it is more risky than Dorsal Penile Nerve Block (DPNB) or ring block and requires a significantly greater amount of preparation work and time. However, caudal blocks will be addressed because they are occasionally employed in neonates as well. A study by Margetts, McFadyen, and Lambert (2008) attempted to determine whether there was any difference in length of analgesia between a ketamine/bupivacaine caudal mixture and a bupivacaine dorsal nerve block of the penis. The patients’ vital signs were monitored, as well as a pain scale, time of waking, time of first analgesia, and time of first voided urine (micturition). This study supports others, as there was no difference between the quality of analgesia provided by the two means. Caudal provided a slightly longer duration of analgesia, but was associated with motor block, as well as delayed micturition and other side effects in some studies. Despite the side effects, however, the researchers agree that caudal adjuvant drugs provide analgesia during the operation, as well as post-operatively, that is just as effective as a dorsal penile nerve block.

Topical anesthesia. Topical anesthetics such as EMLA cream (Eutectic Mixture of Local Anesthetics – 2% lidocaine/ 2% prilocaine) and ELA-Max (4% lidocaine) have also been used to manage the pain associated with circumcision. The advantage of topical application of local anesthetic is the fact that it is non-invasive. However, its disadvantages include the need for administration an hour to an hour and a half before the procedure, as well as a lower level of efficacy than the injected nerve blocks. EMLA

cream is highly effective when applied before the application of a nerve block, as it dulls the initial pain and burning associated with the lidocaine injection (Lander, Brady-Freyer, Metcalfe, Nazerali, & Muttit, 1997).

Oral analgesia. Oral sucrose has also been used to control pain during circumcision, because it is believed to have antinociceptive effects on newborns. Sugar solutions are thought to cause endorphin production and decrease crying time during painful procedures. Advantages include a rapid onset and few side effects. Oral sucrose solution has been shown to produce a marginal reduction in pain, but there is debate over whether the analgesic effect is produced by the sucrose alone or its use in combination with the comforting effect of sucking on a pacifier. Sucrose alone does not provide sufficient analgesia for this procedure, but can be used in combination with nerve blocks or topical anesthetics to increase the amount of pain relief achieved (Kass & Holman, 2001; Razmus, Dalton, & Wilson, 2004).

Kass and Holman's (2001) research did not support the idea that concentrated oral sugar solutions were as effective as nerve blocks at reducing circumcision pain. Their study compared crying time and evidence of pain between infants given a placebo (sterile water), infants given D50 (a 50% dextrose solution), and infants given a dorsal penile nerve block. Pulse oximetry and heart rate were measured after pain intervention and before the circumcision began, then every minute during and after the procedure. The infants who received a DPNB had significantly shorter crying time, lower heart rate, increased oxygenation, and lower pain scale scores than the groups receiving water or D50. The water and D50 groups had dramatic increases in heart rate and drops in oxygenation, with no significant differences between the two groups. Concentrated sugar

solutions given orally do not provide adequate pain relief for circumcision, but, according to other studies, may provide a synergistic effect when offered with other methods of anesthesia (Kass & Holman, 2001).

The other oral medication commonly used for circumcision pain is acetaminophen, also known as Tylenol. Tylenol is frequently administered after circumcision and is often used, not as an adjunct to anesthesia, but in place of anesthesia. The American Academy of Pediatrics does not consider acetaminophen sufficient pain relief for circumcision. It is very effective as an adjunct to local anesthetics, although not in the immediate postoperative period. Tylenol administration does, however, decrease pain scores four to six hours after the procedure. Tylenol provides good pain relief when used in conjunction with a regional anesthetic and should be administered shortly after circumcision and continued as long as pain-scale scores indicated that it is necessary (AAP Policy Statement, 2006).

Intravenous opioids have also been used in neonates undergoing circumcision, but this is very rare. Most healthy infants do not require intravenous access, and initiating an IV line in order to give IV medications would create more stress and make the circumcision procedure even more traumatic. However, infants who are already receiving IV therapy for various reasons may be given IV analgesia during and after circumcision. A study by Anand (2008) indicated that this may not be safe. Although he agreed that it is vitally important to manage pediatric pain to avoid far-reaching effects on pain processing, development, and response to future stress, he has found that in neonates opioids may not be the best choice when the acute pain is caused by injury. They have been shown to have many harmful side effects, including the potential for tolerance and

altered brain development. Furthermore, their efficacy has not been established in the neonatal population. Administering drugs with potential severe side effects to a population in which researchers are uncertain whether they are even effective is unwise at best and irresponsible at worst. This study concluded that nonpharmacological methods of pain relief are actually safer and more effective than opioids at relieving pain from basic procedures in neonates. Opioids should be used as a last resort due to the risk of systemic side effects and permanent harm.

There has been no definitive decision between dorsal penile nerve block and ring block in terms of which is the most effective. There are multiple studies supporting both positions. However, it has been established that DPNB and ring block are more effective than caudal block, topical anesthesia, and concentrated oral sugar solutions. Results concerning the caudal block are not included here because its use in neonatal circumcision is infrequent and only recommended in special circumstances (Kass & Holman, 2001).

Razmus, et al. (2004) performed a study that evaluated the degrees of pain relief offered by the different forms of analgesia. They compared pain scores and vital signs in infants receiving all of the following combinations of analgesia: dorsal block, dorsal block with sucrose, dorsal block with sucrose and ELA-Max, ELA-Max, ELA-Max with sucrose, ring block, ring block with sucrose, sucrose alone, and no intervention. (See Table 1.) The researchers utilized the FLACC score, which is a measurement of pain on a ten-point scale based on the appearance of an infant's face, legs, activity, cry, and consolability. Of course, the eleven infants who received no pain intervention at all had the highest FLACC scores at both measured times during circumcision. Sucrose

provided a small amount of analgesia compared to no intervention at all, but not as much as other interventions. The most effective form of analgesia was the dorsal block combined with sucrose, closely followed by the ring block combined with sucrose. The sucrose solution significantly increased the pain relief provided by a nerve block, even though its efficacy by itself was minimal. Topical ELA-Max did cause a reduction in FLACC scores, but was obviously less effective than the nerve blocks. One limitation of this study is its failure to explain exactly how the procedures were performed, for example, positioning of the infants, time from administration of medication to beginning of procedure, and whether or not sucrose was given with a pacifier or nipple. Although the study could have been improved, the results are reliable and very similar to those of other studies, which have found DPNB and ring block to have very similar effects.

Finally, a 2005 study suggested that a combination of the two front-runners would be the most effective form of pain relief. Researchers studied three groups – infants receiving dorsal penile blocks, infants receiving ring blocks, and infants receiving both a dorsal block and a ring block. Objective Pain Scale (OPS) scores at rest over the first 24 hours after circumcision were significantly lower in the group of infants who had received the ring block and dorsal block together. OPS scores during urination and activity were lower than the other two groups for the first 6 hours after circumcision, and need for supplemental analgesia was lower than in the groups receiving only DPNB or only ring block. Further study would be necessary to eliminate extraneous variables, but it seems that dorsal penile nerve block combined with ring block may be the most effective means of analgesia for neonatal circumcision (Naja, Ziade, Al-Tannir, Mansour, & El-Rajab, 2005).

Table 1. Mean (SD) FLACC for Each Type of Analgesic During Circumcision at Times 1 & 2.

Type	Time 1	Time 2
Dorsal Block (N=7)	3.71 (2.36)	2.00 (2.16)
Dorsal Block/sucrose (N=16)	2.75 (2.32)	2.12 (2.22)
Dorsal Block/sucrose/ELA-Max (N=3)	4.33 (1.15)	3.33 (2.88)
ELA-Max (N=6)	5.17 (3.71)	3.00 (2.10)
ELA-Max/sucrose (N=8)	5.12 (3.14)	3.50 (2.00)
Ring block (N=15)	5.47 (2.17)	3.92 (2.40)
Ring block/sucrose (N=44)	3.18 (2.56)	2.59 (2.56)
Sucrose (N=22)	6.14 (2.31)	5.10 (1.92)
None (N=11)	6.91 (3.02)	6.25 (3.41)

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Policy and Procedure. Although there may continue to be some debate regarding which methods are the most effective at relieving the pain associated with circumcision, it has been thoroughly established that adequate forms of anesthesia and analgesia are available for neonates undergoing circumcision. A major problem, though, is that these methods are not used as often or as effectively as they ought to be. Numerous studies, including a few discussed here, have demonstrated that inadequately managed pain leads to heightened responses to future painful stimuli and must be avoided. This cannot be achieved by one branch of medical staff, but rather requires a multidisciplinary plan and protocol. The hospital studied implemented a strict protocol for pharmacologic relief of procedural pain, as well as nonpharmacologic pain relief techniques and education. Leadership from all relevant departments were included in the protocol formulation and enforcement, and when the protocols went into effect, the success was dramatic. The number of pediatric and neonatal patients receiving adequate anesthesia and analgesia rose from 2% to 92%. The conclusion is that a multidisciplinary approach increases compliance to the protocol for analgesia (Cregin et al., 2008).

Research into this subject is ongoing, and the methods deemed most effective will likely change over time. However, medical care must be driven by evidence-based practice, and procedures must be updated through multidisciplinary task forces to reflect what is currently accepted as the best practice. Circumcision restraint chairs should certainly be employed instead of the Circumstraint board wherever possible (Stang, et al., 1997). Circumcisions should only be performed with adequate analgesia, preferably in the form of a dorsal nerve block or ring block supplemented with oral sucrose on a pacifier and pre-treated with EMLA cream or Ela-MAX (Naja, et al., 2005). In order to

advocate effectively for patients, nurses must be aware of the outcomes of ongoing research and push for policy changes that reflect the highest standard of care possible (Cregin et al., 2008).

Care after Circumcision

Newborns require approximately one week to recover fully from circumcision. During that time period, the site should be covered with a liberal amount of petroleum jelly and a few pieces of gauze. The petroleum jelly is necessary to prevent the penile mucosa from adhering to the gauze or the inside of a diaper, as removing the gauze or diaper would then re-open the wound and cause bleeding. Bacitracin, Neosporin, or similar antibiotic ointment may be applied along with the petroleum jelly, but should not be used alone. Gentle bathing with mild, unscented soap is allowed, but there should be no vigorous scrubbing of the surgical area. Vigorous cleaning will cause more harm than good as it may disrupt the healing circumcision. Tylenol is generally recommended for pain for the first few days or until the infant seems comfortable enough to discontinue the medication (O'Reilly, 2007).

Expect to see a small amount of watery yellow drainage and some swelling. A small yellow crust may even form at the area. This should not be washed away or removed, as it will slough off on its own. Signs to watch for include fresh bleeding beyond the first twenty-four hours after circumcision, drainage of pus from the surgical site, severe or prolonged pain, and redness or swelling of the entire penis or genital area. The child's pediatrician should be notified if any of these occur (O'Reilly, 2007).

Conclusion

Neonatal circumcision is a highly individual decision that should be supported by nursing and medical staff. Cultural and religious requirements for the care of these infants should be accepted by the healthcare team as long as patient safety is maintained. The procedure, if carried out in the hospital, should be performed with adequate anesthesia and analgesia according to evidence-based practice. Adequate pain management will require a multidisciplinary approach to the topic, but much of the responsibility falls on nurses to educate parents and properly prepare infants for circumcision. Nurses working in this area must maintain a current knowledge base and be willing to advocate for their smallest patients.

References

AAP Policy Statement. (2006). Prevention and management of pain in the neonate: An update. *Pediatrics*, 118 (5). Retrieved from <http://aappolicy.aapublications.org>.

Anand, K.J.S. (July 2008). Analgesia for skin-breaking procedures in newborns and children: What works best? *CMAJ: Canadian Medical Association Journal*, 179 (1). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=hch&AN=32678875&site=ehost-live&scope=site>.

Benatar, M. & Benatar, D. (2003). Between prophylaxis and child abuse: The ethics of neonatal male circumcision. *American Journal of Bioethics*, 3 (2). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=phl&AN=PHL1715232&site=ehost-live&scope=site>.

Buyukkocak, U., Caglayan, F., Caglayan, O., Basar, M., Cakmak, M., Batislam, E., & Ulusoy, S. (October 2005). Anaesthesia and the acute phase protein response in children undergoing circumcision. *Mediators of Inflammation*, 2005 (5). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=19286985&site=ehost-live&scope=site>.

Caudal block. (2005). Retrieved from http://www.pitt.edu/~regional/Caudal/caudal_block.htm.

Circumcision (2010). Retrieved from <http://www.americanbible.org/brcpages/Circumcision>.

- Cregin, R., Rappaport, A.S., Montagnino, G., Sabogal, G., Moreah, H., & Abularrage, J.J. (2008). Improving pain management for pediatric patients undergoing nonurgent painful procedures. *American Journal of Health-System Pharmacy*, 65 (8). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=hch&AN=31976442&site=ehost-live&scope=site>.
- Fergusson, D.M., Boden, J.M., & Horwood, L.J. (2008). Neonatal circumcision: Effects on breastfeeding and outcomes associated with breastfeeding. *Journal of Paediatrics & Child Health*, 44 (1/2). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=27743756&site=ehost-live&scope=site>.
- Gamboa, D., Robbins, D., & Saba, Z. (2007). Bleeding after circumcision in a newborn receiving sildenafil. *Clinical Pediatrics*, 46 (9). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=hch&AN=27149354&site=ehost-live&scope=site>.
- Gollaher, D.L. (1994). From ritual to science: The medical transformation of circumcision in America. *Journal of Social History*, 28 (1). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=9409280957&site=ehost-live&scope=site>.
- Kass, F.C. & Holman, J.R. (2001). Oral glucose solution for analgesia in infant circumcision. *Journal of Family Practice*, 50 (9). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=5372405&site=ehost-live&scope=site>.

- Lander, J., Brady-Freyer, B., Metcalfe, J., Nazerali, S., & Muttit, S. (1997). Comparison of ring block, dorsal penile nerve block, and topical anesthesia for neonatal circumcision. *Journal of the American Medical Association*, 278 (24). Retrieved from <http://www.cirp.org/library/pain/lander/>.
- Lehne, R.A. (2007). *Pharmacology for Nursing Care*. (6th ed.). St. Louis: Saunders.
- Margetts, L., Carr, A., McFadyen, G., & Lambert, A. (2008). A comparison of caudal Bupivacaine and Ketamine with penile block for paediatric circumcision. *European Journal of Anaesthesiology*, 25 (12). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=hch&AN=35589961&site=ehost-live&scope=site>.
- McMillen, S.I. & Stern, D.E. (1984). *None of these diseases*. Grand Rapids: Reville.
- Naja, Z.A., Ziade, F.M., Al-Tannir, M.A., Abi Mansour, R.M., & El-Rajab, M.A. (2005). Addition of Clonidine and Fentanyl: Comparison between three different regional anesthetic techniques in circumcision. *Pediatric Anesthesia*, 15 (11). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=hch&AN=18574478&site=ehost-live&scope=site>.
- O'Reilly, D. (2007). Circumcision. Retrieved from <http://www.nlm.nih.gov/medlineplus/ency/article/002998.htm>.
- Paulos, N., Hart, D., & Rauch, D. (2008). Neonatal Hyperbilirubinemia: An unexpected cause. *Clinical Pediatrics*, 47(4), 388-394. Retrieved from MEDLINE with Full Text database.

Porter, F.L., Porges, S.W., & Marshall, R.E. (April 1988). Newborn pain cries and vagal

tone: Parallel changes in response to circumcision. *Child Development*, 59 (2).

Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=8590054&site=ehost-live&scope=site>.

Razmus, I.S., Dalton, M.E., & Wilson, D. (2004). Pain management for newborn

circumcision. *Pediatric Nursing*, 30 (5). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=14812654&site=ehost-live&scope=site>.

Shlamovitz, G. (2008). Nerve block, dorsal penile. Retrieved from <http://emedicine.medscape.com/article/81077-overview>.

Stang, H.J., Snellman, L.W., Condon, L.M., Conroy, M.M., Liebo, R., Brodersen, L., &

Gunnar, M.R. (1997). Beyond dorsal penile nerve block: A more humane

circumcision. *Pediatrics* (100) (2). Retrieved from <http://pediatrics.aappublications.org/cgi/content/full/100/2/e3>.

Steadman, B., & Ellsworth, P. (2006). To circ or not to circ: Indications, risks, and

alternatives to circumcision in the pediatric population with phimosis. *Urologic*

Nursing, 26 (3). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=hch&AN=21110345&site=ehostlive&scope=site>.

Van Howe, R.S. (2006). Incidence of meatal stenosis following neonatal circumcision in

a primary care setting. *Clinical Pediatrics*, 45 (1). Retrieved from

<http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=hch&AN=19781070&site=ehost-live&scope=site>.

- Van Howe, R.S. & Robson, L.M. (2007). The possible role of circumcision in newborn outbreaks of community-associated Methicillin-Resistant *Staphylococcus aureus*. *Clinical Pediatrics*, 46 (4). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=hch&AN=24818885&site=ehost-live&scope=site>.
- Wang, M., Macklin, E., Tracy, E., Nadel, H., & Catlin, E. (2010). Updated parental viewpoints on male neonatal circumcision in the United States. *Clinical Pediatrics*, 49(2), 130-136. Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=47675666&site=ehost-live&scope=site>.
- Werblowsky, R.J. & Wigoder, G. (Eds.) (1997). Circumcision. *The Oxford Dictionary of the Jewish Religion*. New York & Oxford: Oxford University Press.
- Williams, R.M. (2003). On the tail-docking of pigs, human circumcision, and their implications for prevailing opinion regarding pain. *Journal of Applied Philosophy*, 20 (1). Retrieved from <http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=phl&AN=PHL1711889&site=ehost-live&scope=site>.