A Training Model for Circumcision of the Newborn

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Introduction

Nationally, 64% of male neonates are circumcised, but there is wide regional variation: 34% in the West, 80% in the Midwest, and 70% in the Northeast.[1]* A mail survey[2] showed that the percentage of each specialty performing circumcisions at least once a month was obstetricians (70%), pediatricians[1] (35%), and family practitioners[1] (60%). The likelihood that a pediatrician or obstetrician is taught circumcision during residency relates to the prevailing community practice pattern.[3] Thus pediatrician graduates in the Northeast, where 28% pediatric residencies teach circumcision, may be surprised to find this skill expected of them if they relocate to the West, where 68% pediatric residencies teach circumcision.

Training and credentialing for circumcision were not customary in our pediatric service. At the suggestion of our trainees, we arranged demonstrations and developed a model training system that is presented here. We recommend reading both an illustrated description of the newborn circumcision technique, Peleg[4] or Satin,[5] and for ethical and background issues, the American Academy of Pediatrics task force policy statement on circumcision.[6]

The most frequently used techniques are the Gomco clamp (Allied Healthcare Products, St. Louis, MO) and the Mogen clamp (Mogen Circumcision Instruments, Brooklyn, NY). The latter is claimed to be faster and less bloody. It was developed from the traditional shield of the mohels used in ritual circumcisions. No prepuce dorsal slit is needed, and the restricted opening of the arms of this scissors-shaped clamp are designed to prevent entrapment and injury to the glans, although this has been reported.[7]

In the survey[2] and in our two institutions, usages range between 67% and 80% for the Gomco clamp, 10% and 20% for the Mogen clamp, and 0% and 19% for the PlastiBell® (Hollister Inc., Libertyville, IL) device. There is probably greater variation across the country.

The PlastiBell® resembles a disposable Gomco bell—it is inserted under the foreskin without cutting a dorsal slit. The outer rim of the bell has a groove in it and a ligature is passed around the foreskin over this groove and tied securely. The ischemic distal foreskin is excised. The stem and outer part of the bell is detached, leaving the ligature and its underlying plastic rim to drop off with skin necrosis after some days. Hence the PlastiBell® differs from the Gomco clamp in having no lever crushing system. Reports of infection and proximal migration of the plastic rim with injury to the penile shaft have been attributed to the hardware left behind.[8]

*The CDC rates reflect hospital discharge reports and may be falsely low. Quoted survey rates[2,3] may suffer from biased responding and the direction of this effect is not known, but could be falsely elevated. More accurate data are not available.

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The overall complication rates from circumcision[9] range from 0.2% to 5%. In parental counseling, estimates of significant risk of 1 in 500 have been quoted.[10] We have been taught all three methods, but we have grown accustomed to, and teach, the Gomco clamp. Our colleagues use the Mogen clamp; we see no differences in the results.

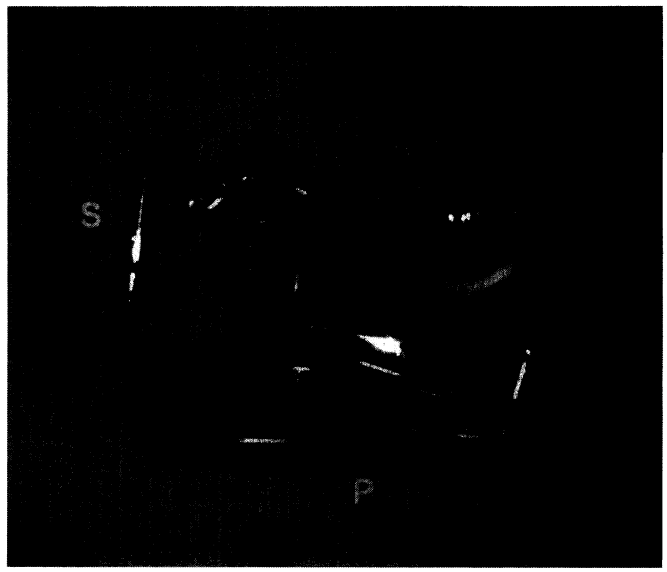

Figure 1. Gomco clamp disassembled.

Method

The largest available Gomco clamp is used in the training model. There are three parts (Figure 1): 1) a flat oblong baseplate (P), which has a hole with a beveled rim at one end and at the other a threaded perpendicular rod and screw nut; 2) a stem (S), with a cross piece at one end and at the other a bell that fits the hole in the baseplate; and 3) a lever (L), one arm forms a yoke that hooks under the cross piece of the bell stem, the fulcrum sits in a groove on the baseplate, and the opposite arm has a hole that fits over the threaded rod and is tightened down by the screw nut.

In use, the bell is positioned beneath the foreskin, so that it covers and protects the glans penis. The baseplate is brought down over the stem to rest on the foreskin overlying the bell. The foreskin is thus trapped between the bell and the baseplate. It is crushed as the yoke and bell on one end of the lever are forced upward by tightening the threaded nut on the opposite lever arm. The crushed foreskin is then cut at the upper surface of the template with a scalpel. If the Gomco clamp has been correctly assembled and a few seconds allowed for crushing, the skin edge does not bleed.

The model system includes a rubber glove on an assistant's hand. A ligature is tied lightly around the glove at the distal interphalangeal joint of the little finger, without obstructing the circulation. When a small pinhole opening is cut at the tip of the glove over the finger, this resembles a penis and prepuce with orifice.

The opening of the "prepuce" is grasped with straight clamps at 10 and 2 o'clock. A third straight clamp is passed into the prepuce and by opening and spreading the tips, the "adhesions" between the glove prepuce and the finger "glans penis" are gently lysed. The clamp is withdrawn, one jaw is reentered dorsally to half the length of the prepuce and on closure this is crushed. After a 5 to 10 second pause, the clamp is removed and a dorsal slit is cut in the crushed area with the rounded tip of the suture scissors—no bleeding from the properly crushed "prepuce."

The free corners of the dorsal slit are grasped with straight clamps and put on tension, the Gomco clamp bell is inserted into the prepuce dorsal slit and pushed down to the limit of the prepuce as created by the ligature. The edges of the dorsal slit are brought together and held with a single curved clamp (Figure 2). The opening of the Gomco baseplate is brought down over the stem of the bell and the edges of the dorsal slit are grasped from above releasing the clamp below the baseplate and allowing the baseplate to fit snugly over the bell.

The yoke of the lever arm is inserted under the crosspieces on the bell, the hole on the opposite arm slides down the threaded rod and the fulcrum drops into the baseplate groove. The wheel is tightened to crush the prepuce and some 8 to 10 mm of glove prepuce is circumcised with a no. 21 blade (Figure 3). The Gomco clamp is dismantled and the neat result is a gloved hand with a circumcised little finger. The site of circumcision is inspected for bleeding and covered with a paraffin gauze dressing.

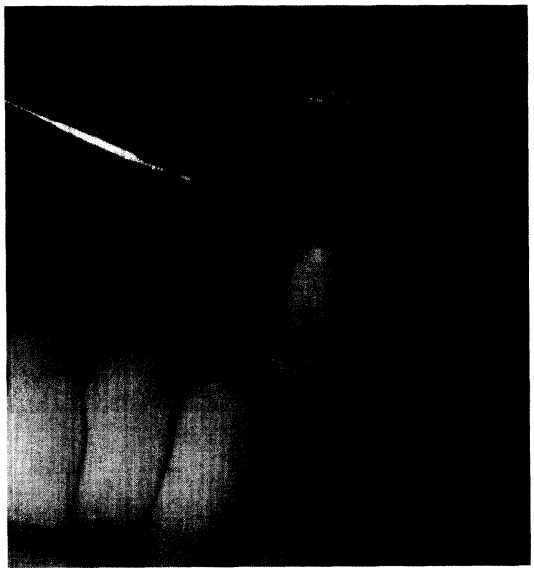

Figure 2. Model gloved hand for training in newborn circumcision, bell within prepuce.

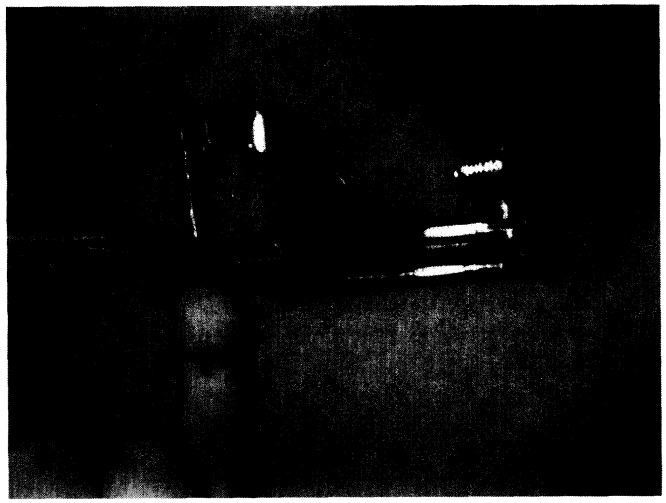

Figure 3. Model, Gomco clamp prepared for circumcision of prepuce.

Discussion

There are some limitations to this model's representation of newborn circumcision, but its simplicity suits its purposes, which are initial training and repetition. The penile ring block we use in circumcising the newborn is not replicated here. The adult fifth digit is larger than the newborn penis, which may be helpful to a neophyte. The glove presents only one layer of epithelium, the foreskin contains both an inner and outer, but using two gloves was a less efficient learning experience.

Bleeding after circumcision can be controlled by searching diligently for the source and crushing it with the tip of a small clamp for 3 minutes, or by placing a suture over it with no. 6 gut on a gastric needle. Silver nitrate application creates a strikingly ugly, temporary, eschar and other hemostatic materials are preferable. Bleeding may originate from vessels at the base of the prepuce, or from vascularized adhesions between the glans and the prepuce. Sufficient crush pressure and time, from an accurately sited and correctly fitted bell and template prevent the former. Adhesions between the glans and the prepuce are usually nonvascular and fragile. They will be lysed, not crushed, by the Gomco clamp and if they are vacularized a hemostatic pressure dressing may be needed.

Unrecognized dissection beyond the prepuce leads beneath the penile shaft skin and may cause a denuded penile shaft. This condition may be mimicked by penile erection after circumcision; the need for correction can be judged after tumescence fades. There is a temptation to leave some prepuce, which, if not repeatedly retracted by the mother, may result in scarring and phimosis. If this is found, a corrective procedure may be made within 2 weeks. If the bell is incorrectly sited, excess internal mucosa may scar proximal to the glans, causing paraphimosis.

Rare complications include hematoma or systemic effect from local anesthesia, injury from inadvertent scalpel stroke, or trapping the scrotum in the clamp. Electrocautery should be avoided. Traumatic injury to the glans should not occur when the Gomco bell encloses it, but may result from incautious separation of the foreskin from the glans.

Conclusion

We introduced trainees with this model and found that although it does not exactly replicate newborn circumcision, it provides a valid learning tool. It provides a satisfactory initial experience in circumcision of the newborn by Gomco clamp.

Acknowledgments

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