

## BRIEF REPORT

# Immediate Complications of Elective Newborn Circumcision

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## ABSTRACT

**OBJECTIVES:** To determine the incidence of immediate complications of elective newborn circumcision in 2 community teaching hospitals.

**METHODS:** We performed a retrospective chart review of all term neonates who had circumcision performed between August 2011 and December 2014 at 2 community hospitals in New York. Neonatal hospital records and subsequent inpatient and outpatient records were reviewed. We classified complications as minor, intermediate, and major.

**RESULTS:** Out of a total of 1115 circumcisions, 1064 met inclusion criteria. There were 41 complications (3.9%), all involving hemorrhage. Sutures were used to control hemorrhage in 3 patients (0.3%). Local pressure or application of hemostatic chemical agents controlled bleeding in the remainder of patients. Bleeding was more common with the use of the Gomco clamp than with the Mogen clamp. Circumcisions performed with Gomco clamp represented 73.2% of the total complications compared with 26.8% with the Mogen clamp. There were no injuries to structures outside the prepuce or problems requiring medical treatment after discharge from the neonatal hospitalization.

**CONCLUSIONS:** The most common immediate complication encountered during an elective neonatal circumcision was bleeding that required only pressure or topical thrombin to achieve hemostasis. Bleeding was more common with the use of the Gomco versus the Mogen clamp. To conclude, our data support the theory that elective infant circumcision can be performed safely in a hospital setting.

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Circumcision is the surgical removal of all or part of the penile prepuce. Elective circumcision can be a preventive health measure, religious, or esthetic in intent. Approximately 1.4 million neonatal circumcisions were performed in United States in 2008.<sup>1,2</sup>

Benefits of circumcision include diminution of heterosexual HIV transmission, other sexually transmitted diseases, and urinary tract infections.<sup>3,4</sup> A recent joint policy statement from the American Academy of Pediatrics and the Centers for Disease Control and Prevention states that the benefits of circumcision outweighs the risks, and elective circumcision of male infants is a reasonable parental choice.<sup>5</sup> The World Health Organization and Joint United Nations Program on HIV and AIDS consider neonatal circumcision an acceptable long-term HIV prevention strategy.<sup>6</sup>

Early complications, such as bleeding, swelling, or inadequate skin removal, are mild.<sup>7</sup> More severe early complications, such as local infection, urinary retention, and partial penile amputation, are rare. Late complications such as penile fistulas, scarring, and deformation are rare. Mortality rate from the procedure is rare.<sup>8</sup> Good pain control is achieved by using local anesthetic cream or an injected penile block.<sup>9</sup> In developed nations, immediate complications are unusual and rarely serious. The risks of the procedure are higher if it is deferred past infancy.

Many studies of circumcision safety have been performed, but researchers mostly have used administrative data or the experience in university centers. There are limited data regarding the outcome of circumcisions done in community hospitals with residency training programs in obstetrics and pediatrics. We sought to determine the rate of immediate postcircumcision complications in 2 community safety net hospitals.

## METHODS

We performed a retrospective chart review using medical records of all term neonates circumcised between August 2011 and December 2014 at 2 community hospitals in New York state. Both hospitals had

residency programs in obstetrics-gynecology and pediatrics. Operators included attending and resident physicians in obstetrics and pediatrics. All circumcisions were performed by using either a Gomco or a Mogen clamp.

Complications were divided into minor, intermediate, and major. Minor complications included bleeding requiring pressure or topical thrombin, wound infection requiring topical antibiotics, and voiding difficulty defined as urinary retention for more than 6 hours after the circumcision resolving spontaneously during hospitalization without any surgical or urologic intervention. Intermediate complications included bleeding requiring suture, wound infection requiring systemic antibiotics, incomplete removal of skin requiring second prepuce excision, or urinary retention requiring assistance of a pediatric urologist. Major complications included threat or actuality of permanent injury that necessitated invasive treatment after hospitalization or death.

## Inclusion and Exclusion Criteria

Newborns born in the hospital or admitted immediately after birth in the well-baby nursery or NICU with a gestational age  $\geq 37$  weeks' gestation were included. Newborns admitted to the NICU with the following diagnoses were included: culture-negative suspected sepsis, transient tachypnea of newborn, transient neonatal

hypoglycemia, and hyperbilirubinemia requiring phototherapy. Preterm and term infants with the following comorbidities were excluded: perinatal asphyxia, respiratory distress requiring invasive mechanical ventilation, hyperbilirubinemia requiring exchange transfusion, or major congenital malformations. The circumcisions were performed during the neonatal hospital stay. Informed consents were obtained from the parents before the procedure, as per hospital policy.

## Data Collection

Data were collected from the electronic medical record (Epic) by direct physicians' review of the chart. Demographic data included age of infant at the time of procedure, type of professional performing the procedure (resident or attending physician), and location of the neonate at the time of the procedure (NICU or newborn nursery).

## Analysis

We used descriptive statistics to compare group demographics and  $\chi^2$  tests for analysis of categorical data.

## RESULTS

A total of 1115 circumcisions were performed during the study period, and of these, 1064 circumcisions were included for analysis and 51 were excluded because of incomplete records. The characteristics of the study group are included in Table 1.

**TABLE 1** Characteristics of the Study Population ( $N = 1064$ )

	<i>n</i>	Percent
Age at the time of circumcision (0–18 d)		
<4	1005	94.5
<9	1050	99.1
Location		
Well-infant nursery or room in	1010	95
Neonatal intensive care	54	5
Operators		
Obstetric residents	486	45.7
Obstetric attending physicians	427	40
Pediatrics residents	6	0.6
Pediatrics attending physicians	145	13.6
Method		
Gomco clamp	594	55.8
Mogen clamp	470	44.2

**TABLE 2** Complications

	None, <i>n</i> (%)	Minor to Intermediate, <i>n</i> (%)	Major, <i>n</i> (%)
Overall complications	1023 (96)	41 (3.8)	0
Bleeding			
Control with pressure	—	24 (58.5)	—
Silver nitrate	—	11 (26.8)	—
Topical thrombin	—	3 (7.3)	—
Suture	—	3 (7.3)	—

—, not applicable.

In Tables 2 and 3, we show the complications found in the study group; all complications were minor to intermediate bleeding. There was less bleeding with the Mogen versus the Gomco clamp approach and no difference in complication rates by residents versus attending physicians. There were no deaths, readmissions for circumcision complications, or anatomic complications noted at discharge or at subsequent clinic visits.

## DISCUSSION

The literature contains different estimates of the beneficial effects of circumcision and of its safety. Benefits include a decreased rate of penile cancer, sexually transmitted diseases including HIV, and urinary tract infections.<sup>10–13</sup>

The American Academy of Pediatrics in its 2012 policy statement stated that the preventive health benefits of elective male newborn circumcision exceed the minimal risks of the procedure. The benefits justify the procedure, and the procedure should be available to those families that elect to do so. Furthermore, they recommend that

physicians should inform parents of the risks and benefits of the procedure so they could make a proper informed decision. The American College of Obstetricians and Gynecologists has endorsed this statement as well.

In recently published articles, authors claim a low complication rate, principally bleeding, and high parental satisfaction.<sup>14,15</sup> Late complications reported are excessive residual skin, excessive skin removal resulting in redundant foreskin, adhesions, phimosis, epithelial inclusion cysts, suture sinus tracts, chordee, buried penis, urethra cutaneous fistulae, and meatal stenosis.<sup>16</sup> Possible effects on sexual health when the circumcised male reaches maturity have been inconclusive, but differences are more likely to be found in studies with poor design.<sup>17–19</sup>

Nontherapeutic circumcision has been controversial in recent years. Although issues of autonomy have surfaced with regard to the appropriateness of parental consent for elective neonatal circumcision, beneficent and nonmaleficent

considerations interact with proposed autonomy considerations on both sides of the issue.<sup>20</sup>

In this study, we also show a low complication rate with bleeding being the most common complication. We observed more bleeding with the Gomco than with the Mogen clamp. The advantage of the Gomco clamp is that the circumcision is performed with direct vision of the glans. With the Mogen clamp, on the other hand, the prepuce is retracted beyond the tip of the glans, and the clamp is closed without direct visualization of the glans. This potentially can result in amputation. The rarity of this complication, combined with the small (although statistically significant) difference in bleeding in favor of the Mogen, do not allow us to make a firm recommendation for one technique over the other. Indeed, a recent small randomized trial revealed no difference in complications.<sup>21,22</sup>

The marked difference in minor bleeding between obstetricians and pediatricians may be due to the method used, frequency of performing circumcision, or lower threshold among pediatricians for applying pressure or local hemostatic agents. In our study, all the circumcisions performed by pediatricians were done with the Gomco clamp.

We believe that obstetricians, pediatricians, urologists, family practitioners, and nonphysician providers with appropriate training and experience all can perform circumcision, subject to the usual considerations of credentialing and clinical monitoring.<sup>23–25</sup>

One of the strengths of our study is that we studied the safety of circumcision as practiced. At the time the circumcisions were performed, there was no academic interest in the procedure at either institution, precluding a Hawthorne effect.<sup>26</sup> The presence and nature of complications were determined from direct review of the chart by physicians, rather than by relying on administratively compiled data.<sup>27,28</sup> Another strength is the clinical settings in which the circumcisions were performed, which were community hospitals serving largely nonprivate patients with residency

**TABLE 3** Bleeding by Method and Operator

	<i>n</i> (%)	<i>P</i>
Method		
Gomco	30 (73.1)	<.001
Mogen	11 (26.8)	—
Operator		
Pediatrics		
Attending physicians	16 of 145 (11)	—
Residents	0 of 6 (0)	—
Obstetrics		
Attending physicians	11 of 427 (2.6)	—
Residents	14 of 486 (2.9)	—

—, not applicable.

training programs. This allowed a snapshot of practice that is likely to reflect circumcision safety in US hospitals. The absence of a control group is not a weakness. The alternative to circumcision is no circumcision, which would have no immediate complications, and the intent of the study was to estimate the safety of medically elective neonatal circumcisions rather than to compare it with other interventions. The major weakness of the study is that we only investigated immediate complications. With the design of this study, we would not capture any impact on sexual function later in life. Finally, we did not use the PlastiBell device, possibly the most widely used circumcision aid, although other studies reveal that the PlastiBell has comparable safety.<sup>29</sup>

With these data, we add to the existing literature on the safety of circumcision in community hospital settings. The most immediate complication encountered was bleeding. No major complications were reported.

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