“A Cut Above the Rest”:
Developing a Circumcision Service

Division of Pediatric Hospitalist Medicine
University of Michigan Department of Pediatrics
C.S. Mott Children’s Hospital
PHM, July, 2017

Disclosures

• None
Introductions

• Our Team

• Who are you?

• Your Experiences/what do you hope to gain?

Objectives

• State the indications and contraindications of the circumcision procedure

• Identify potential benefits and barriers of implementing a circumcision service and potential solutions

• Practice using the GOMCO clamp technique on a circumcision simulation model
**History**

- One of the oldest and most commonly performed procedures
- Evidence of circumcision in Egypt in mummies
- No single origin
- Jewish and Muslim traditions but also other societies without connection to a faith
- Different Opposing purposes
  - Initiation of boys into a tribe
  - Mark of slavery


**Historical Indications**

- Dr. Lewis Sayre - 19th century orthopedic surgeon used amputation or manipulation of foreskin to cure paralysis
- Other Maladies
  - Impotence
  - Masturbation
  - Bed wetting
  - Night terrors
  - Homosexuality

Indications

- Phimosis
- Paraphimosis
- Balanitis
- Localized pathologic conditions of the foreskin (e.g., warts)
- UTI
- Possible role of prophylaxis


AAP Recommendation

- Health benefits outweigh the risks
  – Not great enough to recommend routine circumcisions
  – Sufficient to justify access to the procedure
- Procedure is well tolerated when performed by trained professionals under sterile conditions with appropriate pain management
- Complications are infrequent and lowest in the neonatal period
- Parents deserve factual, unbiased information

Risks

- Bleeding
- Infection: local and systemic
- Poor cosmetic outcome
  - Skin bridges
  - Too little skin removed
- Injury or damage to the penis
- Pain


Benefits

- Most cost effective when done ≤28 days
  - $285 (neonatal) vs $1185 (post-neonatal)
- Post-neonatal has higher complication rates due to anesthesia
- Benefits outweigh risks 100 to 1

Benefits

- Reduction of:
  - UTI (3x-10x)
  - Penile cancer
  - Cervical Cancer in female partners

- STDs
  - HIV
  - HSV
  - HPV
  - Bacterial Vaginosis in female partners


Financial Benefits

- Average reimbursement per circ = $207
- Volume = Average of 200/month
- Revenue for our group = Over $200K net (after facility fee capture and differences in reimbursement rates)
- Revenue for your institution
**Patient Flow**

- A dedicated, standardized service…
  - Assists with timely and predictable delivery of service which should not delay discharges
  - Improves overall quality

**Circumcision Complications**
Outline

- Types of complications
- National data on frequency
- Local data/our experience
- Factors that impact rate of complications

Types of Complications

- Correctional Procedure
- Bleeding
- Infection/Inflammation
- Strictures/Meatal Stenosis
- Amputations
- Adhesions
- Pain
- Poor Cosmesis Without Correctional Procedure
Types of Complications

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AAP 2012 Complications Summary

- The true incidence of complications are unknown, partly due to differing definitions of “complication” and differing standards for the timing of when a complications occurs.
- It is difficult to adequately assess the total impact of complications because the data are scant and inconsistent regarding the severity of complications.
- Significant acute complications are rare ~1/500 (0.2%)
- The majority of severe injuries are so infrequent as to be reported as case reports.
- In general, the specific technique does not afford a significant difference in risk of complications.

National Data on Rates of Adverse Events

- Administrative data set, United States, 2001-2010
- Estimated incidence rate of adverse events (AE) for circumcised vs. uncircumcised by comparing incidence risk ratio and incidence rate difference
- Association rather than causality determined
- Total estimated incidence rate of probable AE was 0.40% for boys circumcised in infancy (1)
  - In same range as smaller, prospective study (2)

Most Common Adverse Events Probably Associated with Male Circumcision

- Correctional Procedures
  - Repair of incomplete circumcision (0.07%)
  - Lysis/excision of penile postcircumcision adhesions (0.06%)
  - Other repairs of penis (0.03%)
  - Division of penile adhesions (0.02%)
  - Suture of laceration of penis (0.02%)

- Bleeding
  - Intraoperative bleeding (0.09%)
  - Hemorrhage control (0.01%)

- Inflammation


Our Experience

- Identified all neonatal circumcision patients by examining billing records from June 2, 2004 to June 7, 2013
- ICD-9 diagnosis codes, procedure codes, and consult notes identified patients with potential complications and revisions
- Complication/revision rates compared by service and method using chi-square and Fisher’s Exact tests
Our Experience

Neonatal Circumcision Provision by Service
Total = 11,900 patients

- Pediatric Hospitalists
- Pediatric Surgery
- Family Medicine

Complications Noted:
- Bleeding
- Urethral/Penile Injury
- Retained device (Plastibell)

<table>
<thead>
<tr>
<th>Overall Complication Rate</th>
<th>Overall Revision Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.34%</td>
<td>0.66%</td>
</tr>
</tbody>
</table>

Overall complication rate consistent with the approximate 0.4% rate seen in literature
Our Experience

- Complication and revision rates by circumcision methodology

<table>
<thead>
<tr>
<th>Complication Rate</th>
<th>Plastibell</th>
<th>Gomco</th>
<th>P value (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.31%</td>
<td>0.21%</td>
<td>&lt;0.0001* (OR=8.35 [3.40-11.88])</td>
</tr>
</tbody>
</table>

Plastibell device has a significantly higher complication rate and rate of revision compared to Gomco clamp.

- Complication and revision rates by service

<table>
<thead>
<tr>
<th>Complication Rate</th>
<th>Pediatric Hospitalists</th>
<th>Family Medicine + Pediatric Surgery</th>
<th>P value (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.24%</td>
<td>0.57%</td>
<td>0.0057* (OR= 2.34 [1.26-4.36])</td>
</tr>
</tbody>
</table>

Pediatric hospitalists had significantly lower complication & revision rates compared to more experienced services grouped together.
Our Experience

- Nonsurgical services can be taught to provide safe circumcision services.
- As seen in other data, complication rates of circumcision by Plastibell are higher than those with Gomco clamps.

Other Factors That Impact Complications

- Age at time of circumcision
- Parents’ versus clinician’s assessment


Parent vs Clinician Assessment

• In a prospective study of 710 male infant circumcisions,

![Bar chart showing parent vs clinician assessment of complications and cosmetic results.]

Circumcisions: Negotiating with Other Departments

Current State

- Identify service primarily performing circumcisions now
  - PCPs
  - OB/GYN
  - Family Medicine

- Meet with key MD stakeholders to identify issues
  - Issues: give up potential revenue source, loss of training for their residents
  - Benefits: free up more time for other things (i.e. clinic visits, delivering babies, etc)
Training and Backup

- Identify service that could potentially train your providers
- Identify service that will perform the “complicated” circumcisions
  - Too small (pediatric surgery)
  - Anatomic abnormalities (pediatric urology)
    • Hypospadias, chordee, twisted raphe, penile-scrotal web
- Identify service/provider that will help with mid-circumcision issues
  - Bleeding, unanticipated hypospadias, dorsal slit without circumcision

Scheduling

- Can be difficult as there are a lot of competing interests
  - Is the doctor available to do it?
  - Is there a tech available to assist?
  - Is the nurse ok with the circumcision being done?
  - Is the procedure room free?
  - Is the baby greater than 12 hours old?
  - Has the bath been given?
  - Is the baby available?
    • Feeding
    • Family visiting
    • Hearing Screening
  - Does a parent want to watch and are they available?
Scheduling

- At our institution, we have dedicated times for circumcisions
  - 8:30pm-10pm
  - 5:00am-6:00am
- This allows us to capture every baby born in a 24 hour period prior to discharge at a time when they are greater than 12 hours old
- Sets the expectation of when the circumcisions are to be done
  - Ex: bath done prior, feeding not done in this window, techs available, room free

Steps involved and time it takes

- Obtain consent (10 minutes)
- Bring the baby to the procedure room (1-5 minutes)
- Prep the baby for the circumcision and perform a time out (1-5 minutes)
- Perform the circumcision (10 minutes)
- Bring the baby back to the room (1-5 minutes)
**Coordination**

- **Hospitalists**
- **RN**
- **Tech**
- **Clerk**

<table>
<thead>
<tr>
<th><strong>Hospitalist</strong></th>
<th><strong>Tech #1</strong></th>
<th><strong>Clerk</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 8:30 PM</td>
<td>8:30 PM - 10:00 PM</td>
<td>Before 5:00 AM</td>
</tr>
<tr>
<td><em>Notify Tech Leader @ 23030 if staff not available for 8:30 am</em></td>
<td><em>Notify Tech Leader @ 23030 if staff not available for 5:00 am</em></td>
<td><em>Notify Tech Leader @ 23030 if staff not available for 8:30 am</em></td>
</tr>
<tr>
<td><em>Check that procedure room is ready</em></td>
<td><em>Check white board for surgery for which baby was scheduled</em></td>
<td><em>Verify consent form with RN, aware of procedure completion time</em></td>
</tr>
<tr>
<td><em>Check white board for surgery for which baby was scheduled</em></td>
<td><em>Update first baby to procedure room</em></td>
<td><em>Complete post-procedure notes</em></td>
</tr>
<tr>
<td><em>Check white board for surgery for which baby was scheduled</em></td>
<td><em>Perform circumcision</em></td>
<td><em>Notify OB Leader for 23030 if staff not available for 8:30 am</em></td>
</tr>
<tr>
<td><em>Complete post-procedure notes</em></td>
<td><em>Write all required information for each baby/room</em></td>
<td><em>Complete post-procedure notes</em></td>
</tr>
<tr>
<td><em>Notify OB Leader for 23030 if staff not available for 8:30 am</em></td>
<td><em>Complete post-procedure notes</em></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Tech #2</strong></th>
<th><strong>RN</strong></th>
<th><strong>Clerk</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 5:00 AM</td>
<td>5:00 AM - 6:30 AM</td>
<td>MISC</td>
</tr>
<tr>
<td><em>Notify Tech Leader @ 23030 if staff not available for 8:30 am</em></td>
<td><em>Notify RN Team Leader @ 23030 if staff not available for 5:00 am</em></td>
<td><em>Notify RN Team Leader @ 23030 if staff not available for 5:00 am</em></td>
</tr>
<tr>
<td><em>Check white board for surgery for which baby was scheduled</em></td>
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<td><em>Fill in medical questions in Hospitalist page 2288 and let them know what room for questions</em></td>
</tr>
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*Tech = Tech Leader*
Questions and Answer Session

and

BREAK

Techniques

• 3 potential Techniques for Neonatal Male Circumcision:
  – Gomco Clamp
  – PlastiBell
  – Mogen Clamp
Initial Steps

- Obtain Informed Consent from the Parents
  - During the process, ask about risk factors for bleeding.
- Perform a time-out prior to the start of the procedure
- Examine the patient’s anatomy for any contraindications

Informed Consent
Techniques – Anatomy


Anatomic Contraindications

- Hypospadias or Epispadias
- Chordee
- Buried Penis
- Size (too small for clamp, micropenis, etc)
- Ambiguous genitalia
- Penile web
- Penile torsion
The Steps Common to all Techniques

• Immobilize the baby
• Provide analgesia
• Prep and drape in a sterile fashion.

*UpToDate

Analgesia

• AAP and ACOG guidelines recommend pharmacologic analgesia for safe and effective pain control during circumcision
Analgesia options

• Topical Anesthetics
• Dorsal penile nerve block
• Circumferential or Ring block
  – A RCT showed that efficacy of Ring block > Dorsal block > EMLA (Lander JAMA 1997)

• Adjuvant therapies:
  – Sucrose
  – Acetaminophen

Topical Anesthetics

• 4% lidocaine cream or lidocaine-prilocaine cream (EMLA) are similarly effective

• 4% lidocaine is preferred to EMLA:
  – faster onset on action (20-30 min vs 60-90 min)
  – fewer side effects and adverse reactions: Newborns may be predisposed to prilocaine-related methemoglobinemia

• Associated with an increased risk of skin irritation (erythema, swelling, blistering)
**Dorsal penile nerve block**

- 27G or 30G needle with 1 mL syringe
  - Insert at 2 o’clock position at the base of the penis
  - Repeat at 10 o’clock
  - In a posteromedial direction, to 0.3 - 0.5 cm depth
  - Needle should be freely movable, indicating it is in loose connective tissue, without blood return
- 0.4 mL of 1% lidocaine without epinephrine is injected.
- Takes effect in about seven minutes.

**Circumferential or Ring nerve block**

- Insert into the lateral side of penis base
- 0.4 mL of 1% lidocaine without epinephrine is injected to create a bleb
  - Advance needle circumferentially around the base of the penis, completing a 180 degree half circle.
- Frequently apply negative pressure prior to enlarging the subcutaneous ring.
- Procedure is repeated on the opposite side of the penis
- Takes effect in about seven minutes.
**Adjuvants**

- **24% sucrose on a pacifier**
  - Safe and effective for reducing procedural pain.
  - Optimal dose not identified due to inconsistency in effective sucrose dosage among studies. (Cochrane Review 2013)
  - throughout procedure as needed for agitation or signs of pain.

- **Acetaminophen**
  - Both to be used as needed in *ADDITION* to lidocaine

**The Steps Common to all Techniques**

- Place 2 hemostats on the foreskin (at the 3 o’clock and 9 o’clock positions):

  *UpToDate*
The Steps Common to all Techniques

- Break down adhesions using a 3rd hemostat:
  *UpToDate

Using the Mogen Clamp

- Pull foreskin up over the glans and apply the clamp. The foreskin is then cut against the clamp:
  *UpToDate
Using the Gomco or PlastiBell

- After breaking up adhesions, create a dorsal slit by first clamping the foreskin tissue to be cut, then cutting along this clamped tissue to minimize blood loss.


Using the Gomco or PlastiBell

- Retract the foreskin and make sure all adhesions have been reduced.
**Using the PlastiBell**

- Fit the PlastiBell over the glans.
- Pull the foreskin over the bell.
- Tie a string at the site you want the foreskin to be removed.
- Break off the handle of the bell.
- The tissue distal to the string will become necrotic and will fall off, along with the PlastiBell apparatus, in about 1 week.

**Using the Gomco**

- After adhesions have been cleaned, pull the foreskin up and fit the bell in the foreskin, over the glans:

Using the Gomco

- Using a hemostat, clamp the dorsal slit together over the bell. (Can also use a safety pin or suture)
- Remove the hemostats at the 3 and 9 o’clock positions.

*UpToDate

Using the Gomco

- Place the base plate over the bell.
- Using another hemostat, reach through the bevel hole on the base plate and again clamp together the dorsal slit. (alternatively, pull the safety pin through the bevel hole)
- The foreskin can then be pulled through the bevel hole using this hemostat or safety pin.

15;58(4):891-898
Using the Gomco

• After pulling the foreskin up through the bevel hole, apply the rocker arm then screw down the nut.


Using the Gomco

• Using a scalpel, cut off the foreskin.
  – Trick: After the foreskin is removed, turn the scalpel over (with blade to the ceiling) and use the point of the blade in the groove between the bell and bevel hole to remove any remaining skin.

Using the Gomco

- Wait 5 minutes for hemostasis
- Remove the clamp.

*UpToDate

 Comparing the Methods

- Overall, all 3 techniques have similar reported complication rates.
  - There are, however, a few case reports of amputation of the glans using the Mogen Clamp.
  - There are also reports of failure of the PlastiBell device to spontaneously fall off, requiring intervention for removal of the device.
Comparing the Methods

- All methods have been shown to be relatively well tolerated. The Mogen clamp, however, is faster and better tolerated than the Gomco clamp.
- All 3 methods can be easy to use with proper training.

Procedure Note

Circumcision Procedure Note
Preoperative Diagnosis / Indication: Redundant foreskin
Postoperative Diagnosis: Circumcised penis
Resident Performing Procedure (if any):

Procedure and Findings:
An informed consent was obtained by myself or my partner. I reviewed the document with the parent/s, discussing the risks and benefits, verified that it was signed, and gave the parent/s the opportunity to ask questions.

A time-out was called out immediately prior to the procedure, verifying correct patient, procedure site, and positioning. The infant was placed on a restraining board, prepped and draped in a sterile fashion. Local anesthetic was applied as follows:

Anesthetic Agent/Block: Sucrose solution on pacifier, with parents’ permission. Lidocaine 1% 1.0 cc as a dorsal nerve block/ventral nerve block/circumferential block.

The adhesions between the glans and the foreskin were separated by blunt dissections. A dorsal slit was made and the Gomco circumcision clamp was applied in the usual manner. The clamp was left on for 5 minutes for hemostasis. The foreskin was then excised with a scalpel and the clamp was removed. No active bleeding was noted. The infant was dressed in a double diaper with Vaseline applied as a pressure dressing. The infant was returned to the mother in good condition. A circumcision care handout was provided to the parents. Tylenol was written for 15mg/kg every six hours as needed for pain.

Gomco Clamp Size Used: ***

Estimated Blood Loss: Minimal

Billing/Coding:
54150 Circumcision
Care Afterwards

Care Afterwards (continued)
References


References

- Stevens B1, Yamada J, Lee GY, Ohlsson A. Sucrose for analgesia in newborn infants undergoing painful procedures. Cochrane Database Syst Rev. 2013 Jan 31
Simulation
and
Question and Answer Session

Thank You and Go Blue!