

# Are physicians performing neonatal circumcisions well-trained?

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## Abstract

**Introduction:** Notwithstanding the recommendations from the Canadian Pediatric Association and the American Academy of Pediatrics on the indications for neonatal circumcision, this procedure is still common in North America and throughout the world. Our purpose is not to argue whether this procedure should be done, but rather to examine who is doing it, their training, how it is performed and how can we prevent unsatisfactory results and complications. The objective is to identify what fields of knowledge require improvement and then design a teaching module to improve the outcomes of neonatal circumcision.

**Methods:** A 19-question cross-sectional survey, including a visual identification item, was submitted to 87 physicians who perform neonatal circumcisions in Southwestern Ontario, Canada. To improve our response rate, study subjects were contacted in a variety of ways, including mail and fax and telephone. Once the survey was completed, we produced a surgical technique training video on using the Gomco clamp and the Plastibell techniques. A knowledge dissemination workshop was held with survey participants to discuss contraindications and the use of anesthesia and management of complications of neonatal circumcision and to evaluate the surgical technique training video. A 6-month follow-up questionnaire was completed to determine the impact of the teaching course on participants' daily practice.

**Results:** In total, we received 54 responses (62% response rate). From these, 46 (85%) were family doctors and pediatricians, while the remaining 8 (15%) were pediatric general surgeons and urologists. The circumcisions were carried out with the Gomco clamp 35 (63%) and the Plastibell 21 (37%). No respondent admitted to learning the procedure through a structured training course. Of the non-surgeons, 19 (43%) learned to perform a circumcision from a non-surgeon colleague. A little over a third of the participants (17, 31%) were happy to perform a circumcision in a child born with a concealed penis, where circumcision is contraindica-

ted. With respect to the early complications post-circumcision, 8 (100%) surgeons versus 29 (63%) non-surgeons felt comfortable dealing with bleeding ( $p = 0.046$ ). In total, 7 (88%) surgeons versus 16 (35%) non-surgeons were comfortable dealing with urinary retention ( $p = 0.01$ ). Also, 8 (100%) surgeons versus 24 (52%) non-surgeons were comfortable dealing with a wound dehiscence ( $p = 0.02$ ). Moreover, 6 (75%) surgeons and 5 (10%) non-surgeons were comfortable managing meatal stenosis ( $p < 0.01$ ). Five (63%) surgeons versus 15 (33%) non-surgeons were confident in dealing with a trapped penis post-circumcision ( $p = 0.24$ ).

**Conclusions:** Our survey findings indicate that most physicians performing neonatal circumcisions in our community have received informal and unstructured training. This lack of formal instruction may explain the complications and unsatisfactory results witnessed in our pediatric urology practice. Many practitioners are not aware of the contraindications to neonatal circumcision and most non-surgeons perform the procedure without being able to handle common post-surgical complications. Based on our survey findings, we planned and carried out a formal training course to address these issues.

## Introduction

Circumcision is the most common neonatal surgical procedure performed on males in several countries, including the United States,<sup>1</sup> Australia,<sup>2</sup> the United Kingdom<sup>3</sup> and Canada.<sup>4</sup> Despite its prevalence, this procedure remains highly controversial and has not been endorsed by the Canadian Pediatric Association<sup>4</sup> nor by the American Academy of Pediatrics (before Fall 2012).<sup>1</sup>

In a recent policy statement, the American Academy of Pediatrics states that current evidence indicates the health benefits of the procedure outweigh the risks.<sup>5</sup> Canadian parents choose to have their children circumcised for social grounds, therapeutic reasons or as part of a religious ritual. According to a national survey of maternity experiences and practices in Canada, about 50% of all male newborns undergo circumcision, with Ontario having the highest rate of circumcision among provinces.<sup>6</sup> Neonatal circumcision

has been associated with many adverse side effects, ranging from abnormal cosmetic appearance to more serious complications, including infection, bleeding, penile adhesions, concealment of the penis, complete or partial degloving of the skin of the penis, urethro-cutaneous fistula, amputation of the glans and even death.<sup>7-9</sup> The true rates of unsatisfactory cosmetic results and surgical complications following neonatal circumcision are difficult to ascertain as there is a lack of published material. Despite these limitations, some publications have attempted to quantify the complication rate. The estimated complication rate in the United States ranges from 0.2% to 3%.<sup>10</sup> In 1998, Moses and colleagues<sup>11</sup> reported a complication rate of 0.2% to 2%, while Williams and Kapila reported complication rates between 2% and 10%, as well as 2 deaths directly related to the complications of circumcision.<sup>7</sup> Higher rates of complications have been published from a study in Jordan.<sup>9</sup> These authors have reported overall complication rates up to 26%, with most problems attributed to untrained clinical practitioners. A strong body of evidence has confirmed that circumcision, despite being a technically simple and commonly performed procedure, is associated with serious complications when not carried out by trained and experienced physicians.<sup>7-9,12,13</sup>

In Canada, similarly to several other countries, standardized training for neonatal circumcision is lacking. The main objective of this study is to sample the nearby clinical community to gain a better understanding of the current clinical training, prevention and management of neonatal circumcision complications and experience.

## Methods

A cross-sectional survey of Southwestern Ontario health practitioners was carried out after institutional Research Ethics Board approval (REB 09-177) was obtained (Appendix 1, <http://journals.sfu.ca/cuaj/index.php/journal/article/view/200/1265>). The survey was distributed and results were compiled over 5 months, from May to September 2009.

## Study population

An attempt was made to contact all healthcare professionals who perform neonatal circumcisions in Southwestern Ontario. As there is no national database or referral centre for this procedure, a list of all potential healthcare practitioners was compiled using multiple methods. All obstetric wards, maternity clinics, family practice units, family medicine community health care clinics and family physicians offices in the catchment area were contacted by telephone. An Internet search was also done to identify individual healthcare professionals who perform neonatal circumcisions.

## Survey methodology

All identified healthcare practitioners were assigned a unique study identification number to ensure anonymity. Furthermore, all contact with the study participants was carried out by research staff. We used the following strategies to improve survey response rates, according to the Dilman method: (1) Two-week pre-notice letters were sent to all participants to explain the survey; (2) Three weeks after the survey was sent, reminder postcards were mailed to participants; and (3) Letters were sent to non-responders a month after the original invitation. Only summative data was presented to the study investigators. Initially, all survey packages were sent out by mail and included an introductory cover letter outlining the purpose of the study, the survey incentive and the declaration of confidentiality. At 2, 4, 8 and 12 weeks after the initial contact, the survey package was resent to all non-responders. Individual responses remained confidential and questionnaire completion was voluntary.

## Statistical analysis

We summarized frequencies of the responses with percentages using SPSS v.17.0 (SPSS Inc., Chicago, IL). All answers were included in the analysis, irrespective of whether the entire questionnaire was completed. A comparison between surgeon and non-surgeon participants was carried out using Fisher's exact test due to the small number of surgeon participants. Results with a  $p$  value  $<0.05$  were considered statistically significant.

## Results

The study population included 87 physicians who perform neonatal circumcision in Southwestern Ontario, Canada. In total, there were 54 (62%) respondents (Table 1). Of the respondents, 46 (85%) were family physicians and pediatricians, while the remaining 8 (15%) were pediatric general surgeons and urologists.

The methods employed to perform the procedure were the Gomco clamp in 35 (63%) and the plastibell in 21 (37%). There was no statistically significant difference between the two groups of physicians in terms of method used to carry out the procedure. When asked about their training background with respect to neonatal circumcision, 19 (43%) of the non-surgical group admitted to learning the procedure from a colleague pediatrician or family physician, while all of the surgeons learned the procedure during their formal surgical training. None of the respondents attended a continuing medical education (CME) course on neonatal circumcision. In terms of frequency, 22 (48%) non-surgeons performed more than 50 circumcisions per year, compared to 2 (25%) surgeons ( $p = 0.027$ ) (Table 1).

**Table 1. Circumcision survey results**

	All physicians N (%)	Non-surgeon group N (%)	Surgeon group N (%)	p value
Respondent demographics		46 (85)	8 (15)	
<b>Source of training:</b>				
Non-surgeon colleague		19 (43)	0 (0)	
Formal training		0 (0)	8 (100)	
CME course		0 (0)	0 (0)	
Physicians performing >50 circumcisions per year		22 (48)	2(25)	0.03
<b>Methods employed:</b>				
Gomco clamp	35 (63)			
Plastibell	21 (37)			
<b>Reported being comfortable managing:</b>				
Complications		29 (63)	8 (100)	0.04
Urinary retention		16 (35)	7 (88)	0.01
Wound dehiscence		24 (52)	8 (100)	0.02
Trapped penis		15 (33)	5 (63)	0.2
Meatal stenosis		5 (10)	6 (75)	<0.01
Would perform circumcision on child with congenital concealed penis	17 (31)			

CME: continuing medical education.

Another area assessed by the survey was physician comfort level in dealing with complications related to neonatal circumcision. According to respondents, the most common early complications included bleeding, urinary retention and wound dehiscence. Eight (100%) surgeons compared to 29 (63%) non-surgeons were comfortable in dealing with bleeding ( $p = 0.046$ ), 7 (88%) surgeons compared to 16 (35%) non-surgeons were comfortable in dealing with urinary retention ( $p = 0.01$ ), and 8 (100%) surgeons compared to 24 (52%) non-surgeons were comfortable in dealing with a wound dehiscence ( $p = 0.02$ ). Furthermore, with respect to late complications post-circumcision, 5 (63%) surgeons

were comfortable in dealing with a trapped penis compared to 15 (33%) non-surgeons ( $p = 0.24$ ); 6 (75%) surgeons compared to 5 (10%) non-surgeons were comfortable managing meatal stenosis ( $p < 0.01$ ).

Respondents were also shown a picture of a congenital concealed penis (Fig. 1) and asked if they would be prepared to proceed with a circumcision in such a patient. About one-third of the total physicians surveyed, 17 (31%), could not identify this congenital anomaly and preferred to proceed with the circumcision even in this case where it is contraindicated.

Based on the survey findings, we produced a surgical technique training video, and developed a training course that was attended by 33 practitioners to educate them on all surgical aspects of neonatal circumcision. Out of the 33 participants, all of them (100%) completed the evaluation forms immediately following the workshop (Appendix 2, <http://journals.sfu.ca/cuaj/index.php/journal/article/view/200/1266>). We tabulated the results of the evaluations (Table 2). All participants (100%) rated the Introduction and Preoperative sections of the workshop as either "good" or "very good," on a 7-point Likert Scale. Evaluation of the surgical technique video revealed that 29 (88%) participants rated the video as either "good" or "very good," while 24 (73%) rated the Complications section, and 28 (85%) the Discussion section as either "good" or "very good." Overall 30 (91%) participants rated the workshop as either "good" or "very good." Almost all participants 30 (91%) would recommend this workshop, while 26 (79%) said they will change their clinical practice because of this workshop.

Six months after the formal teaching session, a second survey (Appendix 3, <http://journals.sfu.ca/cuaj/index.php/journal/article/view/200/1267>) was distributed to these practitioners (Table 3). The response rate for this second

**Fig. 1.** Congenital concealed penis.

**Table 2. Circumcision workshop evaluation**

	N (%)
Response rate	33 (100)
Sections rated "good" or "very good"	
Introduction	33 (100)
Preoperative section	33 (10)
Surgical technique video	29 (88)
Complications	24 (73)
Discussion	28 (85)
Overall rating of "good" or "very good" for workshop	30 (91)
Would recommend workshop	30 (91)
Will change clinical practice because of workshop	26 (79)

survey was 63% (22/33). Out of the respondents, 22 (100%) reported an increase in confidence in identifying patients who were not candidates for circumcision; each physician identified at most 5 patients who were contraindicated for neonatal circumcision since the workshop. Participants were able to offer enhanced local anesthesia for the procedure on a regular basis, with 16 (76%) reporting an increase in their comfort with anesthesia. Over half of the respondents, 12 (55%), reported improvements in their surgical technique, and 20 (91%) practitioners felt more comfortable dealing with common postoperative complications. These findings suggest that a considerable improvement in all four topics addressed by the course (contraindications, surgical technique, use of local anesthetic and ability to deal with complications) was perceived by respondents.

## Discussion

Neonatal circumcision continues to be requested by many parents despite its few medical benefits.<sup>12</sup> The complications associated with this procedure, although avoidable in most cases, may have a lasting detrimental impact on the patient and his parents. Our survey revealed that non-surgeons, comprising both family physicians and pediatricians, perform most neonatal circumcisions in Southwestern Ontario, Canada. None of our respondents acknowledged having any formal training in performing circumcisions, in identifying contraindications to the procedure, or in preventing or managing common postoperative complications. When shown a picture of a congenitally concealed penis, which is an absolute contraindication to neonatal circumcision, more than one-third of respondents were prepared to proceed with the circumcision without hesitation.

The surgical group demonstrated higher comfort levels in dealing with early surgical complications related to neonatal circumcision. This can be explained by the fact that surgeons routinely deal with postoperative surgical care.

According to Le and colleagues, many residents plan to perform a neonatal circumcision even without adequate preparation in their residency.<sup>14</sup> Practice on a neonatal circum-

**Table 3. Post-workshop survey results**

	N (%)
Response rate	22 (63)
Increased confidence identifying contraindicated patients	22 (100)
Increased comfort with anesthesia	16 (73)
Improved surgical technique	12 (55)
Increased comfort managing complications	20 (91)

cision surgical model was found to improve the perceived knowledge, skill and comfort level of trainees performing neonatal circumcision.<sup>15</sup>

Based on our survey findings, we designed and implemented a formal training course on neonatal circumcision. A second survey was sent to those physicians who attended the course 6 months later to determine the actual implications for practice change. Based on these results, we found that respondents' improved in recognizing contraindications to neonatal circumcision, using local anesthesia when performing the procedure, performing the operation and improving postoperative care.

Before the workshop, we used to see about 2 cases of complications from neonatal circumcision in our emergency department per week. With this increase in perceived comfort related to the procedure among community physicians in our area, we have seen fewer patients in the emergency room with acute complications related to neonatal circumcision in the past 2 years. After the workshop, this number has substantially decreased to about 1 case every 2 months. It is difficult to know if this is the result of our training course, as patients with complications may have been seen at other hospitals or by other physicians. That said, it is still too early to reach any definitive conclusions and only time will tell what impact our formal training has had on physicians in our area performing this common procedure.

As with many other fields in medicine, we strongly believe that all physicians performing or wishing to perform neonatal circumcisions should be certified by attending a formal training course, such as the one developed at McMaster University. Our results suggest that formal education on neonatal circumcisions may be related to improvement in the outcome and reduction in the overall complication rate of this surgical procedure. We have developed a web-based teaching module for all physicians currently performing or wishing to perform neonatal circumcisions ([fhs.mcmaster.ca/mpsrc/neonatalcircumcisioneducation.html](http://fhs.mcmaster.ca/mpsrc/neonatalcircumcisioneducation.html)). Such a module will provide standardized and structured training to improve the outcome of circumcisions and, most importantly, to reduce its related complications.

We have identified a few limitations to our study. We acknowledge that our cohort of surgical practitioners is small and this is a reflection of the limited number of practitioners performing the procedure in their community-based practi-

ces. Furthermore, it is difficult to estimate the true incidence of early complications related to neonatal circumcision in our area, as not all complications related to the procedure are referred to us and there is also a lack of a prospectively collected database of neonatal circumcisions in the community to track the number of complications. Moreover, an element of subjectivity cannot be ruled out when trying to assess a practitioner's comfort level in dealing with the early complications of neonatal circumcision. In addition, some practitioners elected to have the survey faxed to their office and this may have impaired their ability to answer the visual recognition question due to a poor quality image. This may also explain why some practitioners failed to provide a response to the visual recognition portion of the survey.

Lastly, based on the 2012 American Academy of Pediatrics policy statement on circumcision,<sup>5</sup> we presume there will be an increased demand to circumcise neonates. Therefore, it is imperative to educate physicians performing this operation. We propose that such structured training can be achieved through CME courses or through a teaching video that can be accessed electronically.

## Conclusion

This survey documents that most physicians have not received any formal training on neonatal circumcisions. This may translate into failure to recognize contra-indications, performance of inadequate surgery and lack of satisfactory postoperative care. Our assessment highlights the necessity to educate physicians who intend to perform neonatal circumcision. We propose that such structured training can be achieved through a CME course or through a teaching video that can be accessed electronically, such as the one we have developed.

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