

## Comparison of Wound Healing Time in Circumcision Patients with The Finesealer Method and The Electrical Cauter Method

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**Abstract:** Circumcision is an operative action performed by cutting the prepuce to prevent infection in the penis and is considered a religious practice, especially in Islam. There are many modern circumcision methods, one of which is the fine sealer method and the electrical cauter method, with different processes and results. This study aims to determine the process of healing wounds after circumcision by comparing the results of circumcision in the fine sealer method and the electrical cauter method. This study uses an observational analytical research type with a case-control design. This study was conducted by comparing the circumcision results of the group of children who underwent circumcision with the fine sealer method and the group of children with the electrical cauter method. The number of subjects studied was 60 children, with 30 children in the fine sealer group and another 30 children in the electrical cauter group. Data analysis used the Kolmogorov-Smirnov normality test and the Mann-Whitney test as a comparative test. There was a significant difference in post-circumcision wound healing between the fine sealer and the electrical cauter with a significance value of 0.000 ( $p < 0.05$ ) and there was a difference in mean rank for the two methods with the mean rank in the electrical cauter group of 39.00 compared to the fine sealer group of only 22.00. This study concludes that the fine sealer method shows a faster healing process than the electrical cauterisation method.

**Keywords:** Electrical cauter, fine sealer, wound healing process, circumcision.

### INTRODUCTION

Circumcision in men is the removal of part or all of the preputium that covers the penis. The word "circumcision" comes from the Latin *circum* (meaning "to twist") and *caedere* (meaning "to cut"). According to *Population Health Metrics*, the

percentage of circumcision practices globally in 2016 reached 37.7 per cent, while in Southeast Asia the rate of circumcision practice reached 31.45 per cent from research taken in 11 countries, and in Indonesia itself the percentage of circumcision practice reached 92.5 per cent,

which is most often done in children aged 5-12 years.<sup>1</sup>

Circumcision, or commonly known as circumcision, is carried out by most people for hygiene purposes as well as religious and cultural reasons. Circumcision is one of the five human fitrahs in Islam, in addition to the sunnah of shaving moustaches, cutting nails, plucking underarm hair and shaving pubic hair. This has been mentioned in one of the narrations of Abu Daud's hadith, From *Abu Hurairah*, he said; *The Prophet PBUH*, said: "There are five things that are included in fitrah; cutting mustaches, cutting nails, plucking underarm hair, cutting pubic hair, and circumcision" (HR. Abu Daud).<sup>2</sup> In addition, the practice of circumcision can prevent the accumulation of *smegma* or *waxy material* secreted by the preputial glands in the penis and is also an initial management in cases of phimosis and paraphimosis.<sup>2</sup>

Before performing the circumcision action, it is mandatory to pay attention to several basic principles, namely asepsis, adequate removal of preputial skin, good hemostasis and cosmetics. However, complications in circumcision can occur. This is influenced by experience, skills and procurement of the tools used. Complications that can occur with circumcision include bleeding, infection, excessive skin cutting, penile trauma, metal stenosis, *skin bridge*, anaesthesia complications and mortality.<sup>3</sup> These things can be avoided by performing circumcision according to good and correct procedures and skills. In addition, currently, there have

been many innovations in circumcision methods that have been researched and developed in the hope that circumcision will be easier to do and can avoid the risk of complications.<sup>3</sup>

Some of the innovations of modern circumcision methods that have been applied today are *the electrical cauterisation* method and *the finesealer* method. The *electrical cauter* method is a circumcision procedure using a hot, electrically charged metal plate as a cutting tool, which can minimise the risk of bleeding with a lower cost and level of complications and provides convenience in the wound suturing process. The *finesealer* method is one part of the circumcision of the clamp method, which is a combination of *high cauter /bipolar* methods, clamps, and glue to close the wound so that it provides minimal bleeding results and no need for stitching. Wound treatment is also easier to do with this method compared to other methods, but tends to be more expensive considering that circumcision wounds are covered with glue, which has a relatively higher price than sewing thread.<sup>3</sup>

Several studies on the comparison of the wound healing process after performing circumcision with several methods have been carried out, such as in the study of Efendi and Azza in 2010, namely a comparison between conventional methods and *electrical cauterisation*, with the result that the wound healing process in the *electrical cauter* method is faster than the conventional method.<sup>4</sup> Then, research by Thalib in 2021, namely a comparison between the *electrical cauter* method and

the clamp method, found that the wound healing process in the clamp method is faster than the *electrical cauter method*.<sup>5</sup>

Then there is also a study by Wahyuningrum in 2020 regarding the comparison between the glue method and the glue method, which found that the wound healing process in the glue method is much faster than the glue method.<sup>6</sup>

However, no studies have been found that compare the wound healing process in the *finesealer* method, which is a combination of *electrocautery*, clamp, and glue *techniques*. Based on this background description, the researcher felt that further research was needed to conduct further research on a comparison of the length of post-circumcision wound healing time using *the finesealer* method and *the electrical cauter method*.<sup>5</sup>

## METHOD

This study applies an observational analytical research approach with a *case-control* design. In this study, identification and observation were carried out on the sample group of patients who underwent circumcision with the *electrical cauter* method and the sample group of patients who underwent circumcision with *the finesealer* method and then compared the wound healing process between the two groups. In addition to observing the wound healing process, the length of post-circumcision wound healing time in patients undergoing circumcision with *the electrical cauter* method and *the finesealer* method will be studied by the researcher by

making observations on the 3rd, 5th, 7th, and 14th days.

The samples in this study were selected by means of consecutive sampling, in which in this method the researcher selected samples that met the research criteria until a certain period of time, until the number of samples was met. In this study, the number of samples needed was calculated using the formula for calculating the size of comparative bivariate analytical samples. It was found that the minimum number of samples needed in each sample group was at least 30 children. For the circumcision of the *finesealer* method, as many as 30 children, and circumcision of the *electrical cauter* method, as many as 30 children. So that the number of samples in this study is at least 60 children.

The processed data is then analysed with several types of data analysis tests, namely *the Kolmogorov-Smirnov* normality test, which aims to determine what statistical test is appropriate to use, both parametric statistical analysis tests and non-parametric statistical tests. If the data results are distributed normally, then a data test is carried out to compare the wound healing process with the *electrical cauter* method and *the fine sealer* method, namely, using non-parametric statistical analysis. A non-parametric statistical test used to compare two methods with different samples is by using the independent Sample T-Test. However, if the data is not normally distributed, an alternative analysis used to compare two methods with different samples is to use the Mann-Whitney test.

## RESULT

### Respondent Age

The distribution of research samples based on the age of the children who are the subjects in the study is presented in Table 1, which explains that out of a total of 60 samples, as many as 6 children (10%) were 12 years old, of whom all 12-year-old children chose to circumcise using *the electrical cauteriser* method.

Furthermore, as many as 8 children (13.3%) were 6 years old, a total of 5 children chose to circumcise with the fine sealer method, and as many as 3 children chose to circumcise with the electrical cauter method. Then, 7 children aged 7 years (11.7%) with 5 children choosing to circumcise using the fine sealer method and 2 other children choosing to circumcise using the electrical cauter method.

A total of 9 children (15%) were 8 years old, with 7 of them choosing to circumcise with the fine sealer method and 2 other children choosing to circumcise with the electrical cauter method. 9 children aged 9 years (15%), of which 4 children chose to be circumcised with the fine sealer method, and 5 other children chose to be circumcised with the electrical cauter method.

Then the sample of 10-year-old children (21.7%) was 13 children, with 6 children choosing to circumcise with the fine sealer method and 7 children choosing to circumcise with the electrical cauter method. Then, 11-year-old children (13.3%) were 8 children, with 3 children choosing to circumcise with the fine sealer method and 5 other children choosing to

circumcise with the electrical cauter method.

Table 1. Respondent Age

Age	Fine sealer		Electrical cauter		Total	
	n	%	n	%	N	%
6 y.o	5	20.00	3	10.00	8	13.3
7 y.o	5	16.7	2	6.7	7	11.7
8 y.o	7	23.3	2	6.7	9	15.00
9 y.o	4	13.3	5	16.7	9	15.00
10 y.o	6	20.00	7	23.3	13	21.7
11 y.o	3	10.00	5	16.7	8	13.3
12 y.o	0	0.00	6	20.00	6	10.00
<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>60</b>	<b>100</b>

### Univariate Data Analysis

Table 2. Univariate Data Table

Day		Fine sealer		Electrical cauter		Total	
		n	%	n	%	n	%
<b>Day 3</b>	Skor 0:	0	0.0	0	0.0	0	0.0
	Healed	8	26.6	0	0.0	8	13.3
	Skor 1-5:	22	73.3	23	76.7	45	75.0
	Mildly Healed	0	0.0	7	23.3	7	11.7
	Skor 6-10:						
	Moderate Healed						
	Skor 11-15:						
	Not Healed						
<b>Day 5</b>	Skor 0:	0	0.0	0	0.0	0	0.0
	Healed	30	100.0	0	0.0	30	50.0
	Skor 1-5:	0	0.0	30	100.0	30	50.0
	Mildly Healed	0	0.0	0	0.0	0	0.0
	Skor 6-10:						
	Moderate Healed						
	Skor 11-15:						
	Not Healed						

<b>Day 7</b>							
Skor 0:	12	40.0	0	0.0	12	20.0	
Healed	18	60.0	17	56.6	35	58.3	
Skor 1-5:	0	0.0	13	43.3	13	21.7	
Mildly	0	0.0	0	0.0	0	0.0	
Healed							
Skor 6-10:							
Moderate							
Healed							
Skor 11-15:							
Not							
Healed							
<b>Day 14</b>							
Skor 0 :	30	100.0	13	43.3	43	71.6	
Healed	0	0.0	17	56.6	17	28.3	
Skor 1-5:	0	0.0	0	0.0	0	20.0	
Mildly	0	0.0	0	0.0	0	0.0	
Healed							
Skor 6-10:							
Moderate							
Healed							
Skor 11-15:							
Not							
Healed							

Day	Fine sealer method	-	Not normally distributed
14	Electrical cauter method	0.000	Not normally distributed

Based on Table 2, it can be seen that the wound healing score in the fine sealer group on day 3 was improved by 73.3% with a total of 22 children with a score of 6-10 (moderately healed). Meanwhile, children with a score of 6-10 (moderately healed) in the electrical cauter group were 76.7% with a total of 23 children, and 23.3% of children with a score of 7-11 in the electrical cauter group had a score of 11-15 (not healed). Then it was found that in the fine sealer group, there was a score of 1-5 (mildly healed) with a total of 8 children (26.6%), but in both groups of fine sealers and electrical cauters, a score of 0 (healed) was not obtained. Then on the observation on day 5, children who underwent circumcision using the fine sealer method obtained a score of 1-5 (mildly healed) with a total of 30 children (100%), while in the electrical cauter group, a score of 6-10 (moderately healed) was obtained with a score of 30 children (100%). On the 7th day of observation, in the fine sealer group, there was still a score of 6-10 (moderately healed) with a total of 18 children (60%) and a total of 12 children (40%) who had received a score of 0 (healed). In the electrical cauter group, no children with a score of 0 (healed) were found, a total of 17 children (56.6%) with a score of 1-5 (mildly healed) and a total of 13 children (43.3%) with a score of 6-10 (moderately healed). Then on the last day of observation on the

### Normality Test

**Table 3. Results of the Kolmogorov-Smirnov Normality Test**

Treatment	P-Value	Keterangan
<b>Day 3</b>	Fine sealer method	0.007 Not normally distributed
	Electrical cauter method	0.025 Not normally distributed
<b>Day 5</b>	Fine sealer method	0.002 Not normally distributed
	Electrical cauter method	0.004 Not normally distributed
<b>Day 7</b>	Fine sealer method	0.000 Not normally distributed
	Electrical cauter method	0.023 Not normally distributed

14th day, all children who underwent circumcision with the fine sealer method had received a score of 0 (healed) and were declared cured, but in the electrical cauter group there were still 17 children (56.6%) with a score of 1-5 (mildly healed) and as many as 13 children (43.3%) with a score of 0 (healed). In Table 3 above, the results of the Kolmogorov Smirnov test are presented and it is found that all data groups obtained are not normally distributed, so a comparison test is carried out on each sample group with a non-parametric statistical test which in this study is used by Mann Whitney.

Comparison of Post-Circumcision Wound Healing Process using *Fine Sealer* Method and *Electrical cauter* on Days 3,5,7, and 1

**Table 4. Comparison Results of Each Observation Phase**

Treatment	Mann Whitney		
	Mean rank	p-value	Conclusion
Day 3	Fine sealer	15.73	Significant Differences
	Electrical cauter	45.27	
Day 5	Fine sealer	15.50	Significant Differences
	Electrical cauter	45.50	
Day 7	Fine sealer	15.73	Significant Differences
	Electrical cauter	45.27	
Day 14	Fine sealer	22.00	Significant Differences
	Electrical cauter	39.00	

In Table 4 above, it has been explained that the significance value (p-value) is smaller with  $\alpha = 0.05$ , which is 0.000 in each time group ( $p < 0.05$ ). This proves that the post-circumcision wound healing process between the *fine sealer* and *electrical cauter* methods at each observation on day 3, day 5, day 7, and day 14 shows a significant difference in the healing process.

Comparison of Post-Circumcision Wound Healing Process using *Fine Sealer* Method and *Electrical cauter*

The decision-making criteria based on probability value (p-value) or significance (asyp. Sig.) are: "If the significance value of  $> 0.05$ , then  $H_0$  is accepted, while if the significance value is  $\leq 0.05$ , then  $H_0$  is rejected". The following are the results of the Mann-Whitney test processed using SPSS 26 software:

**Table 5. Hypothesis Test Results**

Treatment	Mann Whitney		Conclusion
	Mean rank	p- value	
Metode <i>Fine Sealer</i>	20.15	0.000	Significant Differences
Metode electrical cauter	40.85		

Based on the results of the *Mann-Whitney* test in Table 5, it shows the significance value of 0.00

## DISCUSSION

From the data from the research results mentioned earlier, overall 60 research subjects with an age range of 6-12 years, most of the children who underwent

circumcision were children with an age range of 9 years. In Indonesia, the age of circumcision is carried out on children before the age of puberty or before the child reaches puberty in accordance with religious and cultural recommendations.<sup>6</sup>

In carrying out the circumcision procedure, the Circumcision 123 team previously interacted with patients and also provided explanations about the circumcision method, both the *fine sealer* and the *electrical cauteriser*. When giving *informed consent* to patients, the team also conducts *patient assessments* to find out the presence of allergies, side effects, interactions, suitability (dosage, duration, amount of drugs and other special conditions), patient complaints and other matters related to the study of clinical aspects. After obtaining *informed consent* and the necessary information, the team consisting of doctors (operators) assisted by nurses (co-operators) made preparations before the action, namely the installation of underpads, small pillows for infant patients, checking equipment such as *minor sets*, *sealers* (glue), BHP (consumables) *fine sealers*, lamps, *headlamps*, bipolar devices, marker markers, and ensuring the availability of suppositories, additional anesthesia (lidocaine), epinephrin, topsy cream, and the installation of leg bandages and circumcision curtains.<sup>7</sup>

The circumcision action of *the fine sealer* starts from examining the patient, especially the penis and preputium, then providing an explanation if there are certain special conditions. Before performing anesthesia, the penis area is first sprayed

with iodine and swabbed using an alcohol swab, then administer anesthesia injections either by *penile block* or infiltration and then check whether the anesthesia has worked or not by pinching around the preputium to be circumcised. Give a *marker* (mark) of the area to be circumcised using a marker, open the preputium skin until the glans of the penis are completely open, then clean with sterile gauze that has been sprayed with betadine or spray with NaCl liquid. If conditions such as phimosis, OUE (*externum urethra orifice*) abnormalities, crooked penis, *penile webbed*, and cordae tendinea of the penis, then immediately convey it to parents/guardians. Measure the diameter of the penis using the O-meter size measurement, then install a clamp tube according to the marker and try to pull the mucosa as short as possible. Once the clamp tube is attached, cut using bipolar coagulant while pulling the preputium towards the distal and tightly stretched skin, as well as *zero-point* cuts. Then the clamp is removed, and the cutting mark is covered with sterile gauze compress while making sure there is bleeding, then apply a sealer around the preputium that has been cut and aerated with a fan so that the sealer can dry perfectly.<sup>8</sup>

The circumcision action in the *electrical cauter method*, after all preparations are completed, the operator installs arterial clamps in the direction of 6 and 12 o'clock then pulls the preputium until the marker line is distal and paired with long bent clamps transversely massaged from distal to proximal, the position of the bent clamp clamps is

clamped lightly and make sure the glans of the penis are not pinched by the crooked clamp. Then make a cut using a cauter, remove the bent clamp and perform hemostasis of the haemorrhage with ligation/binding of the blood vessels. Perform stitching while controlling bleeding, if any. Compress a sterile gauze that has been applied with iodine to the penis for 2 minutes. In this method, the suture wound does not need to be given a verban dressing.<sup>9</sup> Indications for the use of verban in this method are if there is blood secretion in pediatric patients and in adult patients. After all procedures are completed, educate the patient's parents/guardians on how to treat post-circumcision wounds.<sup>10</sup>

From the research procedure that has been carried out by the researcher, it was found that there was a difference in the wound healing process in patients who had been circumcised with the *fine sealer* and *electrical cauter methods*, this was shown through the results of the Mann Whitney non-parametric test which obtained a significance number (*p-value*) of 0.000 ( $p < 0.05$ ). This proves that the wound healing process in the *fine sealer* circumcision method is faster than the electrical cauterisation circumcision method.

In 2022, a study was conducted on the comparison of circumcision with the non-sutureless wound closure method with sutureless wound closure by Jadhav, et al. and it was found that the wound healing process in the *sutureless* method was much faster than the sutureless wound closure method with the wound healing time

process in the non-sutureless group) for approximately 12 days, and in the group, it was sewn for about 14 days.<sup>11</sup> The results of this study are related to the research conducted by the author, where wound healing in the *fine sealer* method, which uses glue (*sutureless*), is much faster than the *electrical cauter method*, which still uses the wound stitching technique (*hecting*) to close the wound. From the results of the study, it was found that the two techniques gave the same results although it was not stated exactly what specific methods they used in this study.<sup>12</sup>

In some conditions, such as children who are less cooperative and also children with special needs, the *fine sealer* method is much more effective and time-saving compared to the *electrical cauter* method, but in children who have entered puberty, the *fine sealer method* is less recommended because it tends to cause an erection that causes the glue that has been attached to become detached. The *electrical cauter* method that uses *the hecting* process for post-circumcision wound closure is more recommended in children who have entered puberty and adult men. In addition, *the electrical cauterisation* method is also cheaper than *the fine sealer method*.<sup>13</sup>

The REEDA Scale (Redness, Oedema, Ecchymosis, Discharge, Approximation) is a tool for assessing perineal healing that was first developed by Davidson and later reviewed by Carey. This scale includes five components related to the healing process, namely hyperemis, oedema, ecchymosis, discharge of fluid or exudate and copetition of edge wounds.<sup>14</sup>

This scale has been used in recent studies that have examined interventions aimed at assessing suture techniques on the perineum, pain, postpartum perineal care and the effects of laser irradiation on perineal pain. This shows that the REEDA Scale can be used to assess postoperative wounds and healing wounds, including circumcision, because it has suitable calculation points.<sup>15</sup> The assessment using this scale is based on the number of points obtained from each observation made with a value of 0 which is categorized as *healed* or healed, the value range of 1-5 is categorized as *mildly healed* or slightly healed, 6-10 is categorized as *moderately healed*, and 11-15 is *not healed* or not healed.<sup>16</sup>

The acquisition of this high wound healing score is due to the condition of adhesion or adhesion of the preputium to the glans of the penis. Before circumcision is performed, the preputium is tried to be detached from its adhesion to the penis which results in abrasions on the walls of the penile glans so that discharge or secretions in the form of fibrin tissue appear on the glans of the penis.<sup>17</sup> In addition, long wound healing can also be caused by the limitations of this study, namely samples in a group of children using the electrical cauter method taken from mass circumcision participants carried out by the 123 Circumcision Clinic where the operator who performed the circumcision consisted of more than one person. Although the surgical instruments and materials used are in accordance with the standard operating procedures of the Circumcision Clinic 123

including the type of anesthesia and the sewing thread used is absorbable chromic catgut, but regarding the difference between the circumcision operators is enough to consider the limitations or limits of this study.<sup>18,19</sup>

## CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that:

There is a significant difference between the wound healing process in post-circumcision patients using the fine sealer and electrical cauterisation methods

On the 14th day after the child's circumcision with the fine sealer method, all children (100%) were declared cured.

On the 14th day after circumcision of children with the electrical cauter method, as many as 43.3% of children were declared cured.

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