

Duration of Skin Closure, Wound Healing and Cosmesis: A Comparative Study of Cyanoacrylate Adhesive Glue and Vilcryl 2/0 for Episiotomy Skin Closure at Aminu Kano Teaching Hospital, Kano Nigeria

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Abstract:

Background: *Episiotomy is a deliberate incision made on the perineum and posterior vaginal wall during vaginal delivery to make the delivery of baby easier for mothers. Many women who have just given birth have a new baby and have a new wound to care for. Mothers are in great need for relief from pain and discomfort for effective breast feeding and provision of baby care. This is the exclusive cause for the investigator to use cyanoacrylate glue for promoting pain relief and healing of episiotomy.*

Methodology: *This prospective randomised control trial was conducted on 100 women who had spontaneous vaginal delivery in the labour ward of AKTH. Women who fulfil the criteria were randomized in to 2 groups, for group I (study group) cyanoacrylate was used for skin closure following episiotomy while in group II (control), vilcryl 2/0 was used. The patients were followed up for pain, infection, wound healing*

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and cosmesis over a 14-day period. The data obtained was analysed using SPSS version 21. Quantitative variables were described using mean and standard deviation while qualitative variables were described as percentages. Categorical variables were analysed using chi square test and Fisher exact test, while continuous variables were analysed using Student's t test. The results were presented in tables. P value < 0.05 was considered statistically significant.

Conclusion: Cyanoacrylate glue compared to Vilcryn 2/0 seems to be effective in reducing some of the morbidity associated with perineal repair following childbirth. There was significant reduction in the short-term pain. There was significant reduction in the need for analgesia

Keywords: Episiotomy, cyanoacrylate glue, postnatal mothers, wound healing and pain relief

INTRODUCTION

Episiotomy is a surgical enlargement of the vaginal orifice by an incision to the perineum during the last part of the second stage of labour or delivery. About 85% of women who have a spontaneous vaginal birth will have some form of perineal trauma, and up to 69% will need to have one form of sutures or the other.^{1,2} Although there are various techniques to close the incision of episiotomy, haemostasis and restoration of anatomical structure of the incision site without additional suture are fundamental aspects of success in all methods.²

The origin of episiotomy is difficult to determine, but one of the first to describe it was a midwife, Sir Fielding Old⁴. In 1742, in his *Treatise of Midwifery in Three Parts*, he recommended the procedure for those cases in which the external vaginal opening is so tight that labor is dangerously prolonged in an effort to reduce procedure-related morbidity and improve cosmesis, there have been various attempts to modify and improve the technique of episiotomy.⁵

The cyanoacrylate glue components have Episiotomy is the only procedure in obstetrics which is performed without the patient's specific consent.⁴ The advantage of an episiotomy is that it substitutes a clean cut for a ragged tear, minimizes pressure on the fetal head, and may shorten the last portion of the second stage of labour.³

Various intervention are found to reduce episiotomy pain and enhance the healing process which include administration of analgesics, cleanliness, topical application by dry heat and moist heat, perineal care and complementary therapies.⁶

The cyanoacrylate glue has been proven in many studies to have wonderful benefits for wound healing and skin inflammation. To promote wound healing in the shortest time possible, with minimal pain, discomfort, and scarring to the patient. The glue can safely be applied by lower cadre health personal and thereby reducing waiting time in our labour room and promoting good healing from early repair.

This is to assess the comparison of cyanoacrylate adhesive glue with vilcryn 2/0 for episiotomy skin closure, wound healing and cosmesis and the findings can help in identifying their benefits.

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METHODOLOGY

Study Area

Aminu Kano Teaching Hospital, Kano is one of the tertiary health institutions in the metropolis of Kano State, North Western Nigeria. It has about 660 beds and was established in 1988. The hospital services clients from within Kano and the neighbouring states of Jigawa, Katsina, Kaduna, Bauchi, Kebbi, Sokoto and Zamfara States. Majority of the patients are indigenous Hausa and Fulani, although the Igbo and Yoruba ethnic groups also constitute a substantial proportion of the clients. Most of the people are traders, farmers, businessmen and civil servants. The hospital has about 5500 deliveries every year with an episiotomy rate of 41.4%.⁷

Study design

A randomized controlled clinical trial was used.

Study population

Consenting women undergoing normal vaginal delivery and had episiotomy performed in the labour ward of Aminu Kano Teaching Hospital, Kano were included and those with Previous existing local infections or lesions in the perineum, H I V disease, Diabetes mellitus, Immunosuppressive treatment and Perineal tear other than episiotomy were excluded.

Sample size determination

The minimum sample size required was calculated using the formula for randomised clinical trial.⁸ with $Z_{\alpha} = 1.96$, the probability of type II error (β) of Power set at 80%=0.84 and δ = standard deviation 1.195. After Adding 10% expected attrition, a total of 50 subjects were required in each group.

Sampling technique

Women who fulfilled the eligibility criteria and consented to participate in the study were randomized in to two groups: group I (study group) and group II (control group). Fifty pieces of paper were marked group I and another 50 were marked group II. These pieces of paper were mixed thoroughly, and each placed in serially numbered 100 opaque envelopes (Randomization) which were kept in a box. Allocation was done by opening a sealed opaque envelope, thus allocating the patients in to 1 of 2 groups. The sealed envelopes were secured and placed in the labour room. The matron in the labour room who was not involved in the study will open the envelopes serially as the patients were prepared for episiotomy repair until completion of the study. Neither the surgeon nor the participants were aware of the allocation of participants to any particular group prior to opening of the envelopes.

GROUP I (STUDY GROUP)

This group comprised of 50 patients. The episiotomy was repaired using vicryl 2/0 on vaginal mucosa by continuous suture up to the muco-cutaneous junction at the

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fourchette, the muscles was sutured using two to three interrupted stitches with the same vicryl 2/0 till haemostasis is confirmed. Skin was cleaned and dried. Following this, the cyanoacrylate glue which is colourless gel in a 10g tube with a separate pen is moved from its pack under aseptic precautions. The cap of the pen was removed, and tip of the glue pen touched to the upper edge of the incision. The bottom of the glue pen is pressed to release the glue. Glue is applied from the tip (upper edge) downwards to the tail (lower edge) of the episiotomy. A gentle pressure was applied on the wound edge using the right index and thumb. As the pen is for single use application, the pen with any residual glue is discarded after use. The wound was then allowed to dry. The time taken from the commencement to the completion of the episiotomy repair was noted.

GROUP II (CONTROL GROUP)

The episiotomy was repaired using the standard technique. Vicryl 2/0 was applied on vaginal mucosa by continuous suture up to the muco-cutaneous junction at the fourchette, the muscles were sutured using two to three interrupted stitches with the same vicryl 2/0 till haemostasis is confirmed. Skin was repaired using subcuticular suturing technique with vicryl 2/0. The time taken from the commencement to the completion of the episiotomy repair was noted.

Data collection method

Structured pre-tested questionnaires were administered to obtain information about the personal data and other relevant information about the study participants after taking history and physical examination of the patients enrolled in the antenatal clinic between 38 to 40 weeks. In both groups a Medio lateral episiotomy were given and suturing of episiotomy was initiated as soon as the patient had delivered. Skin closure was performed with cyanoacrylate glue or continuous subcuticular suture as described above with primary outcome measure by self-assessment of perineal pain during and within the first three days of the procedure and secondary outcome measures by assessing the wound complications, cosmetics, time for wound healing and sexual satisfaction.

Post-operative follow-up

The postoperative period commenced immediately after the completion of the skin closure. Patient in both groups were managed according to departmental protocol. Pain was assessed using the visual analogue score for pain on Day 1 and 3 for pain intensity, patient was given a copy of the visual analogue score sheet to guide them on answering question via a telephone interview for those that couldn't come on Day 3 for assessment. Wound complication, healing cosmetics were assessed on Days 7 and after 2 weeks while sexual function was assessed using female sexual function index (FSFI) six weeks after the procedure during which time women normally resume coitus in our environment according to culture and tradition. Patients were followed up at two and six weeks respectively in postnatal clinic according to departmental protocol. Both the patients and their husbands telephone numbers were collected, and the cost of their transportation and the telephone calls were shouldered by the investigator. Pictures were obtained pre and post-operative respectively.

Data analysis

SPSS Version 21.0 was used for the analysis after entering the data into excel sheet for checking errors and consistency. Descriptive statistics was used to determine the frequencies and percentages of the demographic variables, also Frequency distribution and percentages were used to assess the episiotomy wound status among the study and control group of postnatal mothers. Mean, range and standard deviation were used to assess the level of healing of episiotomy wound before and after the intervention.

Association between qualitative variables were assessed by chi-square test and Fisher exact test appropriately and Associations between quantitative values was by student T test. Quantitative data is represented using mean±SD and median. P-value of <0.05 was taken as considered significant.

Paired t-test was used to compare the level of episiotomy wound status among the study and control group.

Unpaired t-test was used to compare the level of episiotomy wound status among both groups.

Ethical approval

Ethical approval for the study was obtained from Aminu Kano Teaching Hospital Health Research-Ethics Committee. The consent was obtained from all the women that participated in the study. The Helsinki declaration was respected throughout the research.

Results

Socio-demographic characteristics

The mean ages (± Standard Deviation, SD) of the women were 22.71±9.14 and 23.66±9.00 years in the study and control group respectively. In the study group 84% of women were primigravida and 16% were multigravida. In the control group 82% were primigravida and 18% were multigravida but in terms of education 34% and 38% in the study and control group had secondary level of education.

Table 1: Socio-demographic characteristics

Demographic variables		Groups			
		Study		Control	
		No	%	No	%
Age	<20 years	11	22%	7	14%
	20 -25 years	25	50%	26	52%
	26 -30 years	14	28%	15	35%
	>30 years	0		2	4%
	Mean ± SD	22.71±9.14		23.66±9.00	
Parity		42	84%	41	82%
		8	16%	9	18%
Education	None	2	4%	3	6%
	informal	12	24%	9	18%
	Primary	13	26%	12	24%
	Secondary	17	34%	19	38%
	Tertiary	6	12%	7	14%

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Duration of closure

The mean time for skin closure in the study group was 1.16 minutes while in the control group it was 3.52 minutes. In 76% of study group, skin closure took 2 minutes or less, while in only 14% patients from control group skin suturing was completed within 2 minutes. The difference in mean time was 1.36 minutes, which was statistically significant ($p < 0.05$) as shown in Table 2.

Table 2: Duration of skin closure

Duration of skin closure in minutes	Study group	Control group	p- value
1 to 2	76%	14%	0.003*
3 to 4	22%	663.0%	0.014
Mean	1.16±1.0	3.52±1.8	

*Statistically significant

Duration of wound healing

Time for healing: As shown in Table 3, the average time for wound healing in majority of the patients in study group was 4 days while in control group it was 8 days. The difference was statistically significant ($p < 0.05$)

Table 3: Time for wound healing

Days for wound healing	Study group	Control group	p- value
1 to 2	10.9%	6.1%	0.083
3 to 4	89.1%	0.0%	0.001*
5 to 6	0.0%	20.4%	0.001*
7 to 8	0.0%	73.5%	0.001*
Mean±SD	3.2±1.71	6.3±3.92	

* Statistically significant

Cosmesis

There is statistically significant difference in the wound disruption between the study and the control groups with 4 (2%) women in the study group and 8 (4%) in the control group. None of the women had Mal-approximation in the study group as against 4% in the control group ($p > 0.05$).

Table 4: Cosmesis.

Cosmesis	Study group	Control group	p- value
Wound disruption	2%	4%	0.031*
Thick scar	0	2%	0.001*
Mal-approximation	0	4%	0.001*
None	92%	90%	0.271
Total	100%	100%	0.187

*Statistically Significant

DISCUSSION

A good material for skin closure is one which takes lesser time for application, causes less pain to the patient during and after the procedure and has good healing and cosmetic properties; this was the rationale of the present study and the few prior

prospective studies conducted elsewhere. Episiotomy closure consists of closure of mucosa, muscle and skin. The duration for initiation of suturing and duration of suturing of mucosa and muscle layers was noted and compared, which showed no statistical significance. This supports the comparability of the skin closure parameters between the study and control groups.

The results of this study showed that skin closure is faster when CAG is used for episiotomy. This finding is similar to that of Adoni et al who compared episiotomy skin wound repair using either tissue adhesive or suture material in approximately 50 patients in each group. The closure times for the adhesive group were faster than in the control group.⁸ Mota et al and Switzer et al also reported similar conclusions regarding the superior time efficacy of adhesive glue material.^{9,10}

In this study, wound healing was completed in 4 days in 89.1% in study group, which was significantly better than the control group where healing took up to 8 days in majority (73.5%). Similar results were reported by Adoni et al (3 days for wound healing) and Bowen et al (4 days).

When wound complication rates were analysed, a randomized prospective study by Switzer involving around 22 subjects each in CAG and suture groups reported a higher complication rate in the study group. However, both Mota and the present study found similar complication rates in both the study and control groups.⁹ Though ease of application, shorter time, less pain during and after the procedure with CAG are superior to conventional skin suturing, the expected outcome of superiority in wound healing and cosmesis have not been found convincingly in any study, including ours. This may be explained by the inherent differences in skin characteristics in locations other than the perineal skin, and practical difficulties in keeping this area clean and dry in the immediate postpartum period.

The use of CAG in the Nigerian scenario for episiotomy has hitherto not been studied. The finding of this study supports the safe and efficacious usage of cyanoacrylate adhesive glue for episiotomy skin closure. CAG appears to be a superior alternative to conventional suturing, with statistically better time efficiency.

CONCLUSION

Cyanoacrylate glue compared to Vilcryn 2/0 seems to be effective in reducing some of the morbidity associated with perineal repair following childbirth. There was significant reduction in the short-term pain. There was significant reduction in the need for analgesia. The incidence of wound dehiscence was markedly reduced and hence the need for re-suturing. There was no need for suture removal.

What is already known on this topic?

Study on duration of skin closure, wound healing and cosmesis by comparing used of cyanoacrylate adhesive glue and vilcryn 2/0 for episiotomy skin closure was previously studies Nigeria.

What this study adds

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It provides data on duration of skin closure, wound healing and cosmesis by comparing using of cyanoacrylate adhesive glue and vilcryl 2/0 for episiotomy skin closure in AKTH Kano, Nigeria.

Competing interests

Nil

Authors' contributions

Contributed equally

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