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A comparative prospective cohort study between the angled episiotomy scissors and straight scissors in low and outlet forceps delivery

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SUMMARY

AUTHORS' CONTRIBUTION: (A) Study Design · **(B)** Data Collection . **(C)** Statistical Analysis · **(D)** Data Interpretation · **(E)** Manuscript Preparation · **(F)** Literature Search · **(G)** No Fund Collection

Background: Background: Obstetric anal sphincter injuries (OASIS) are reported to depend greatly on episiotomy angle. Episiotomy is done in almost all forceps deliveries.

Aim: To evaluate the extent of vaginal and perineal trauma using the angled episiotomy scissors *vs.* straight scissors.

Design: Prospective comparative observational study conducted in 2 hospitals in Saudi Arabia.

Methods: 60 patients delivered by forceps were divided in 2 groups; angle episiotomy group (n=30) *vs.* straight episiotomy group (n=30), with each having given birth to in a different hospital. The primary outcome measures were the suture angle, suture distance from midline, length of episiotomy, and occurrence of OASIS. Secondary outcomes were pain and neonatal outcomes.

Results: Women with the angled episiotomy scissors, compared with those with straight scissors, had significantly higher post-delivery suture angle, and a longer post-delivery distance from midline. OASIS was significantly lower among angled episiotomy scissors group than among straight scissors group. There were no significant differences between both groups regarding pain or neonatal outcomes.

Conclusion: The present study recommends using angled episiotomy scissors during forceps-assisted vaginal birth because it is associated with a statistically significant decrease in OASIS.

Keywords: OASIS; Forceps delivery; Angled episiotomy scissors; Episiotomy

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INTRODUCTION

Episiotomy was introduced in 1950as a prophylactic procedure to decrease the risk of vaginal and perineal tears as well as to fasten delivery [1]. In a Cochrane review in 2017 there was no evidence that routine episiotomy has the previously assumed benefits and concluded that more restricted use of episiotomies will result in lesser women with severe perineal or vaginal trauma [2]. WHO, 2018 recommend episiotomy performance only when there is a strong clinical indication [3].

In the study of Zhu et al., 2015, It was reported that during low forceps or outlet delivery the use of episiotomy may decrease the rate of vaginal and perineal tears which in turn decrease the amount of intrapartum hemorrhage and decrease the post-episiotomy pain [4]. There are relative indications in second stage of labor for performing low and outlet forceps delivery include; delay of progress of second stage of labor, inability of patient to push especially with increase in use of epidural analgesia, non-reassuring fetal CTG. Also there are strong indications to use outlet forceps in cases of persistent or direct occiptoposterior with delay in descent of head but with head station +2 [5].

In our study we conducted low and outlet forceps delivery with baby's head is at +2 station or +3. In a systematic review in 2010, O'Mahony F et al., found that there is no restriction on rotation for this station in forceps delivery [6].

Obstetric anal sphincter injuries (OASIs) are the leading cause of anal incontinence in women. Episiotomies with a post- delivery suture angle of less than 30° to the midline are more likely to injure the anal sphincter directly, while those with a suture angle of more than 60° are associated with increased incidence of OASIs, as they do not relieve the pressure on the perineum. A safe zone of 40°–60° has been proposed [7,8].

The aim of this study was to evaluate the extent of vaginal and perineal trauma using the episiotomy *vs.* straight scissors. Also, assessment of neonatal APGAR score and birth trauma.

METHOD

This study is a Prospective comparative cohort study

conducted in 2 hospitals in Saudi Arabia (both hospitals are of the same class and level). Selection of cases was according to inclusion and exclusion criteria.

Women who underwent normal vaginal delivery were recruited for this trial. All patients were informed about the purpose of the trial, the procedure modalities, and their benefits as well as risks. Patients were asked whether they are prepared to participate in the trial prior to their inclusion. After being screened for the inclusion and exclusion criteria eligible patients were included into the trial.

Inclusive criteria for patients include: Women between the 21 and 30 years of age, vertex presentation, uncomplicated singleton and term pregnancy in active labor (that was defined as the presence of at least three regular, painful uterine contractions over 10 min with cervical dilatation 4 cm or more), Active labor, Patient willingness to randomize to delivery technique. Exclusive criteria for patients include: age below 20 or more than 30 yrs. Malpresentation and malposition such as breech face and oblique lie, evidence of cephalopelvic disproportion, multiple pregnancies, obstetric complications such as pre-eclampsia, antepartum hemorrhage or known fetal abnormality. Maternal unwillingness to undergo randomization.

The Ethical Committee of two hospitals approved this study. All patients willing to participate signed an informed consent immediately after admission to labor ward and were subjected to detailed history taking (personal, menstrual, obstetric & past history), examination (general, abdominal & local pelvic examination), ultrasonography and laboratory investigations (C.B.C, Rh, blood grouping and albumin in urine).

The primary outcome measures were the suture angle, suture distance from midline, and length of episiotomy while secondary outcomes were maternal pain, wound complications and neonatal outcome.

Sample size justification

The study included all women fulfilling the inclusion and exclusion criteria who were admitted between June 2020 and December 2020 at the 2 hospitals.

All patients were subjected to complete history taking (personal, past history of blood transfusion, previous obstetrical history: in details such as last menstrual period, expected date of delivery etc. (to exclude any contraindication for vaginal delivery). General and obstetric examination were conducted including fetal lie, fetal presentation, estimated fetal weight, fetal heart rate, uterine contraction, and the amount of liquor. Vaginal examination was conducted including cervical dilation, effacement and position, state of fetal membranes, presenting part, position of fetal head, color of liquor and pelvic adequacy.

Group A: Included 30 women who had low or outlet forceps delivery with mediolateral episiotomy with the use of the curved episiotomy scissors in first hospital while Group B: Included 30 women who had low or outlet forceps delivery with mediolateral episiotomy with the use of straight scissors. All forceps deliveries were performed by consultants or senior registrars of the same level of experience in both hospitals.

First group had low forceps vaginal delivery after the cervix was fully dilated and retracted and the membranes ruptured. The urinary bladder was emptied, with the use of a catheter. The station of the head was at least +2 in the lower birth canal. The woman was placed on her back, usually with the aid of stirrups or assistants to support her legs. Ascertaining the precise position of the fetal head is paramount accomplished by feeling the fetal skull suture lines and fontanelles.

At this point, the angled episiotomy scissors was introduced vaginally at crowning, and aligned to orient the guide limb vertically from the posterior fourchette to the anus. While a single cut is preferred, a stagger cut was needed for some women. The two blades of the forceps were individually inserted, the left blade first for the commonest occipitoanterior position; posterior blade first if right or left occipito anterior position, then locked. The position on the baby's head was checked. The fetal head was then rotated to the occiput anterior position when it was not already in that position. The baby was then delivered with gentle traction in the axis of the pelvis. Post-delivery angle was measured by placing a protractor transparency on the perineum after delivery and marking the angle with an indelible ink pen. Per rectal examination was performed prior to suturing to detect OASIs.

Other group had a mediolateral episiotomy with straight scissors, before forceps application followed by the same steps.

Perineal repair following delivery

As soon as birth was completed the initial assessment performed gently and sensitively to classify the perineal trauma caused by episiotomy. Third- and fourth-degree trauma excluded from the research. After full explanation of the procedure to the mother, she was placed in a position allowing good visualization, vulval/perineum washed and draped with sterile drapes. The vagina inspected and the apex of the episiotomy or perineal tear identified. If needed, another infiltration with 1% Lignocaine up to a total of 20mls to the area. A gauze maternity tampon was inserted into the upper vagina, above the trauma to absorb any bleeding from the uterus, which may obscure the field of operation.

The vagina was sutured after good visualization of the apex of the wound starting approximately 0.5 cm above this point and the vaginal wall was repaired using a continuous non-locking stitch Continued to the hymenal remnants, then the needle placed behind the hymenal remnants and emerge in the center of the perineal muscle. After checking the depth of trauma, the perineal muscles were repaired in one or two layers with the same continuous stitch leaving no dead space [9]. The skin was sutured with subcuticular stitches.

All women were assessed for the primary outcome measures including: suture angle, suture distance from midline, length of episiotomy, and the occurrence of OASIS.

Secondary outcome measures of neoborne APGAR score and any evidence of neonatal birth trauma were assessed after delivery.

In the postnatal ward patients were evaluated for pain using VAS score. Follow up: all participants were assessed in the postpartum visit 7-10 days after delivery for wound healing and pain score.

Statistical analysis

Recorded data were analyzed using the statistical package for social sciences, version 20 (SPSS Inc., Chicago, Illinois, USA). The comparison between two groups regarding quantitative data with parametric distribution was done by using Independent t-test. Chi-square (x2) test of significance was used in order to compare proportions between qualitative parameters. Relative risk: The ratio between the risks of the outcome in the patients group to the risk of outcome in the straight scissors group. The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following (p<0.05, Significant and p<0.001 highly significant).

RESULTS

The demographic data was similar in both groups without any statistically significant difference. Regarding the key outcome indicators displayed in (**Tab. 1.**) in our study: using angled-60 scissors, the average episiotomy suture angle was (40.56 ± 2.24 degrees) CI ± 2.24, IQR =35-44, while with the straight scissors, the angle was (29.48 ± 3.37 degrees) CI ± 3.37 IQR =22.0–36.0, P<0.001).

Post-delivery mean distance from midline in was (36.12 ± 3.37) in the angled- 60 scissors group while with the straight scissors, the distance was (20.30 ± 3.06) (36.12 mm, 95% CI ± 3.37, IQR =29-44 *vs.* 20.30; 95% CI ± 3.06, IQR =15–27 P<0.001).

Additionally, we discovered that the angled episiotomies were greater in length (47.323.77 mm compared to 42.333.26 mm for the straight episiotomies, P 0.001) (47.32 mm, 95% CI 3.77, IQR =38.0-57.0 *vs.* 42.33 mm, 95% CI 3.26, IQR = 40.4-42.6 P 0.0001).

OASIS was significantly less frequent among angled scissors group than among straight group.

Tab. 2. Shows no significant difference between angled scissors and straight scissors groups regarding maternal pain and complications at follow up. **Tab. 3.** shows no significant difference between angled scissors and straight scissors groups regarding Neonatal outcomes. **Tab. 4.** shows the maternal pain and complications at follow up among the studied groups. **Tab. 5.** shows the neonatal outcomes among the studied groups.

DISCUSSION

Our results interpretation and comparison with similar studies.

This is a prospective comparative study comparing the Angled scissors with the straight scissors with assisted forceps delivery. The mean episiotomy suture angle measured postpartum in our study with Angled scissors was (40.2 ± 2.2). This is similar to that observed by Freeman RM, et al., [10] it is less than that achieved by Patel and Ubale however, 36% of women in their cohort were parous and this would influence perineal distensibility [11].

Results of present study are also comparable to El-Din et al. [12] who found a post-delivery suture angle of 44 degrees (achieved by marking the perineum with gentian violet).

Post-delivery mean distance from midline in our study was (35.8 ± 3.3) in the angled scissors group while with the straight scissors, the distance was (19.9 ± 3.0) This is similar to that observed by Swant and Kumar who found that the post-delivery linear distance from caudal end of the sutured episiotomy to the anus was 15 mm more with the ANGLED scissors compared to straight scissors [10].

In analysis of present study, it was found, we also found that angled scissors episiotomies were longer. This is similar to that observed by Swant and Kumar who found that angled scissors episiotomies measured longer (47 mm *vs.* 40 mm, P<0.0001) [13].

Obstetric anal sphincter injuries OASIS were significantly less frequent among angled scissors group than among straight scissors group. It was one in the angled scissors episiotomies compared to 8 patients in the straight scissors group. This is similar to that observed by Swant and Kumar, there were no OASIS cases in the angled scissors group *vs.* one in the straight scissors group [13]. But we had

Tab. 1. Demographic characteristics among the studied groups.

Variables		Angled scissors (N=30)	Straight scissors (N=30)	P
Age (years)	Mean ± SD	26.32 ± 2.14	26.21 ± 2.55	^0.857
	Range	22.0–30.0	21.0–30.0	
BMI (kg/m^2)	Mean ± SD	27.85 ± 1.33	28.15 ± 1.22	^0.366
	Range	25.4–31.7	25.2–30.8	
Gestational age (weeks)	Mean ± SD	38.35 ± 0.71	38.36 ± 0.81	^0.960
	Range	37.0–40.0	37.0–40.0	
Previous NVD		10 (33.3%)	9 (30.0%)	#0.785
^ Independent t-test; #Chi square test; p-value >0.05 is insignificant				

Tab. 2. Difference between angled scissors and straight scissors groups regarding maternal pain.

Measures	Angled scissors (N=30)	Straight scissors (N=30)	^P
Mean ± SD	40.56 ± 2.24	29.48 ± 3.37	<0.001**
Range	35.0–44.0	22.0–36.0	
95% CI	39.7–40.9	28.1–29.8	
Benefit of angled scissors over straight scissors			
Items		Mean ± SE	95% CI
Degree elevation		11.30 ± 0.61	10.2–12.7
Mean ± SD	36.12 ± 3.37	20.30 ± 3.06	<0.001**
Range	29.0–44.0	15.0–27.0	
95% CI	34.7–36.6	19.3–20.9	
Benefit of angled scissors over straight scissors			
Items		Mean ± SE	95% CI
Distance elevation		16.04 ± 0.61	14.8–17.3
Mean ± SD	47.32 ± 3.77	42.33 ± 3.26	<0.001**
Range	38.0–57.0	33.0–49.0	
95% CI	45.6–48.1	40.4–42.6	
Harm of angled scissors over straight scissors			
Items		Mean ± SE	95% CI
Length elevation		5.45 ± 0.71	4.08–6.94

^ Independent t-test; p-value >0.05 is insignificant; *p-value <0.05 is significant; **p-value <0.001 is highly significant

Tab. 3. Obstetric anal sphincter injuries among the studied groups.

Measures	Angled scissors (N=30)	Straight scissors (N=30)	#P
Present	1 (3.3%)	6 (20.0%)	0.049*
Absent	29 (96.7%)	24 (80.0%)	
Benefit of angled scissors over straight scissors in avoiding injury			
Items	Value	95% CI	
Rate in angled scissors group	96.7%	91.9%–99.6%	
Rate in straight scissors group	80.0%	77.6%–91.2%	
Rate elevation	16.7%	2.1%–23.9%	
Efficacy	17.3%	1.2%–24.8%	
Relative Rate	1.160	0.998–1.462	
Number needed to treat	6	3.09–102.30	

#using Chi-square test; RR: Relative risk; *p-value <0.05 is significant

Tab. 4. Maternal pain and complications at follow up among the studied groups.

Variables		Angled scissors (N=30)	Straight scissors (N=30)	P	RR (95% CI)
Pain (VAS-10)	Mean ± SD	2.23 ± 0.61	2.14 ± 0.61	^0.570	-
	Range	1.0–4.0	1.0–4.0		
Impaired healing		1 (3.3%)	3 (10.0%)	#0.329	0.33 (0.04–3.03)
Wound infection		1 (3.3%)	3 (10.0%)	#0.329	0.33 (0.04–3.03)

^ Independent t-test; #Chi square test; RR: Relative risk; p-value >0.05 is insignificant

Tab. 5. Neonatal outcomes among the studied groups.

Variables		Angled scissors (N=30)	Straight scissors (N=30)	P
APGAR 1	Mean ± SD	7.57 ± 0.92	7.56 ± 0.82	^0.728
	Range	6.0–9.0	6.0–9.0	
APGAR 5	Mean ± SD	8.48 ± 0.82	8.47±0.82	^0.512
	Range	7.0–10.0	7.0–10.0	
Neonatal trauma (n, %)		0 (0.0%)	0 (0.0%)	-

^ Independent t-test; *p-value <0.05 is significant

higher number of OSAIS, this could be attributed to the instrumental delivery.

No significant difference was detected between the angled scissors and straight scissors groups in terms of maternal pain and complications at follow-up.

Additionally, we discovered no discernible change in APGAR score and neonatal outcomes between the research and straight scissors groups.

STRENGTH AND LIMITATION OF CURRENT STUDY

Strength point of our studies is that it contains adequate no of patients and it is performed in 2 centers but its main weak point is lack of randomization due to difficulty in making randomization in both hospitals.

IMPLICATION IN CLINICAL PRACTICE

In clinical practice, not all the hospitals supply the angled scissors that is designed to episiotomy, the normal deliveries can pass smoothly with straight scissors episiotomy but in outlet or low forceps deliveries the incidence of OASIS is higher.

RECOMMENDATION FOR FUTURE RESEARCH

Further studies are needed to study effect of angled scissors in ventose and kiwi deliveries.

CONCLUSION

To sum up, the use of angled scissors during assisted forceps deliveries has resulted in a statistically significant decrease in OASIS.

ETHICS APPROVAL

Study approved by the ethical commitee of the hospitals mentioned above.

CONSENT FOR PUBLICATION

Non-applicable.

AVAILABILITY AND DATA MATERIAL

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

COMPETING INTERESTS

The authors report there are no competing interests to declare

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