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Impact of Scissors Type Used for Episiotomy on the Prevalence of Obstetric Anal Sphincter Injury: Randomised Controlled Trial

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ABSTRACT

Aim: to compare between the prevalence of obstetric anal sphincter injury (OASIS) after cutting mediolareral episiotomy by angled, curved or straight scissors in women in labour.

Methods: The current randomized controlled trial was conducted at Ain Shams University Maternity Hospital. The participating women were randomly allocated into three arms. Arm (A): women had mediolateral episiotomy cut by angled scissors. Arm (c): women had mediolateral episiotomy cut by curved scissors .Arm (s): women had mediolateral episiotomy cut by straight scissors. Primary outcome was the occurrence of Obstetric Anal Sphincter Injuries (OASIS).

Results A total of 300 primiparous women were included. The overall incidence of OASIS was 5%,17% and 15 % in arm A,C and S respectively.

Conclusion: using angled scissors in cutting mediolateral episiotomy results in less cases of obstetric anal sphincter injury compared to cutting episiotomy by straight or curved scissors.

Keywords: episiotomy, obstetric anal sphincter injury, scissors, mediolateral, angled, straight.

INTRODUCTION

Episiotomy is an incision of the perineum to enlarge the vaginal opening and facilitate delivery [1].It shouldn't be done routinely in normal vaginal delivery but restrictive episiotomy is done in some situations as fetal distress and instrumental vaginal delivery [2]. It should be done at time of fetal head crowning [3].

advantage of less scarring, better cosmetic healing and less blood loss, while mediolateral episiotomy has less incidence of rectal injury [4].

Mediolateral episiotomy angle should be between 45 and 60 degree to avoid perineal tears [5]. The angle of mediolateral incision is different at the time of incision from that after repair. The post incision angle of 60 and 40 degree is 40 and 22.5 degree respectively [6].

Median episiotomy should be approximately one half the length of the perineum. Perineum is the distance from posterior forchette to middle of anal opening [7].

Different types of scissors have been used in cutting episiotomies such as straight, curved and angled scissors. It is thought that curved or angled scissors produce incision away from anal sphincter. However, Obstetric guidelines don't provide sufficient data on comparison of use of different scissors on episiotomy [8].

Episiotomy types are median, mediolateral , lateral, J-shaped and anterior episiotomy. Mediolateral episiotomy is the most frequent type used which extends from midline laterally and downwards away from the rectum .Median episiotomy has the

Episiotomy can be complicated by bleeding, pain, infection, dyspareunia, perineal tears and obstetric anal sphincter injuries [9].

Perineal tears occuring during vaginal delivery affect women's wellbeing [10]. Severe perineal tears may involve anal sphincter which may have co-morbidities as perineal pain, rectovaginal fistula and anal incontinence [11].

Obstetric anal sphincter injuries (OASIS) is known to be a major risk factor for anal incontinence in women, leading to nine times increase in anal incontinence compared with men. Anal incontinence (ie, incontinence of liquid feces and flatus) can have a devastating impact on a person's quality of life [12].

OASIS should be excluded by routine per-rectal examination after every vaginal delivery and if suspected endoanal ultrasound is to be done. Anal incontinence is under-reported by women so obstetricians and midwives should ask about it during history taking [13].

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The association between scissors types, different episiotomy characteristics and obstetric anal sphincter injury is a point of debate that needs to be studied [14].

METHODS

The current randomized controlled trial (RCT) was conducted at the Labour ward of Ain Shams University Maternity Hospital during the period September 2016 and September 2017. The study included three hundred primiparous women with singleton, term pregnancy and vertex presentation of occiput anterior position fetus. Women with previous perineal surgery or circumcision (female genital mutilation) were excluded.

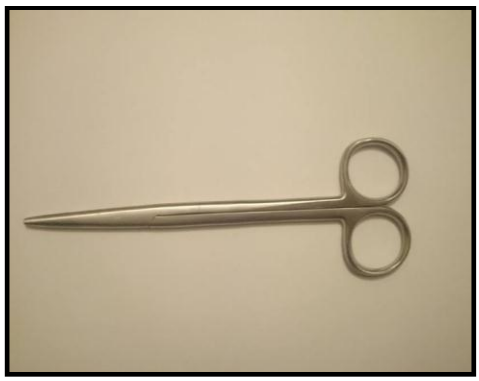
The protocol of the study was approved by the Ethical Research Committee of Obstetrics and Gynecology Department, Ain Shams University. Patient fulfilling the inclusion criteria were approached in the delivery suite. The study was explained to patients who were informed with the patient's information leaflet and patients were willing to participate were asked to sign the informed consent. Randomization was kept by the primary investigator and was not revealed until the fulfillment of the study, results and statistiscs. Randomization was done using a computer-generated random number list generated with MedCalc© software version 14 (MedCalc© Software bvba, Ostend, Belgium) . Study population was randamoized into one of the three following arms:Arm (A): (100)Women allocated to this group had episiotomy cut by straight Mayo scissors. Arm (C): (100)Women allocated to this group had episiotomy cut by curved Mayo scissors.Arm (S): (100) Women allocated to this group had episiotomy cut by angled Braun Stadler episiotomy scissors. Allocation concealment was done by numbering Three hundred opaque envelopes serially and each envelope with the corresponding letter which denoted the allocated group was put according to randomization table. Then all envelopes were closed and put on one box. When the first patient arrived, the first envelope was opened and the patient was allocated according to the letter inside. Double blinding is difficult because the observer will see the used scissor during cutting. However, the measured outcomes are objective and unlikely to be biased by lack of blinding. First stage of labour was managed according to Ain Shams maternity hospital normal labour protocol by continuous monitoring maternal vital signs, assessment of cervical dilatation, effacement, station, position, presentation, fetal cardiotocography and maternal hydration. When cervix was fully dilated, the patient was transferred to delivery room to start the management of the second stage of labour. The patient was placed in the lithotomy position with legs hanged in stirrups and encouraged to bear down during uterine contractions and rest between them until crowning. Local anesthetic of 10 ml Lidocaine 1% (Debocaine® by Sigma company, Cairo, Egypt) was injected at the mucocutaneous junction and testing of loss of pain before episiotomy cutting. Mediolateral episiotomy was cut by scissor at 60 degree angle towards the greater tuberosity. The selection of the type of scissors was according to the designated arm randomly selected Arm (A): Women allocated to this group had episiotomy cut by Braun Stadler angled scissors, which have a 4 cm straight blade and whole length of 18 cm.

Braun Stadler Angled Scissors.

Arm (C) :Women allocated to this group had episiotomy cut by curved Mayo scissors with 5cm curved blade and whole length of 18 cm.

Curved Mayo Scissors.

Arm (S):women allocated to this group had episiotomy cut by straight episiotomy scissors with 8cm Stright blade and whole length of 20 cm.



Straight Scissors.

One or two fingers placed in the posterior vaginal wall to prevent injury of fetal scalp during incision then the episiotomy was cut. Delivering the head was performed using Ritgen's manueuver by placing one hand superiorly to maintain head flexion and other hand was used to exert forward pressure on the chin, then delivery of posterior then anterior shoulder then rest of the body. Third stage was managed actively by administration of intravenous oxytocin at the time of delivery of fetal shoulders. Placental delivery was done by modified Brandet Andrews maneuver using controlled cord traction technique then a vaginal pack was placed to assess the apex -of episiotomy and starting its repair. Episiotomy was repaired using absorbable polyglactan sutures 2/0. Suturing started 0.5 cm above the apex in a continuous manner by suturing different layers of episiotomy to restore anatomy then the vaginal pack is removed. Identification of OASIS was done by performing a pill-rolling motion by placing index finger in the rectum and thumb over the anal sphincter with assessment of the tone and the presence of any defect.

* Perineal tears grading was done accourding to the RCOG guidelines 2015 [15]:

First degree: Injury to perineal skin or vaginal mucosa.

Second degree: Injury to perineum involving perineal muscles but not involving the anal sphincter.

Third degree: Injury to perineum involving the anal sphincter complex.

- 3a Less than 50% of external anal sphincter thickness torn.
- 3b More than 50% of external anal sphincter thickness torn.
- 3c Both external anal sphincter and internal anal sphincters torn.

Fourth degree: Injury to perineum involving the anal sphincter complex (external and internal anal sphincters) and anorectal mucosa.

- OASIS comprises third degree (with its sub-classes) and fourth degree perineal tears.

RESULTS

The mean age of the included women was 23 ± 3 years, mean BMI was 23.4 ± 2.5 kg/m2 and mean gestational age was 39.9 ± 1.3 weeks as shown in table 1.

All groups were comparable as regards the age, BMI and gestational age (p-values,.953,.138, and.982, respectively).

Table1. Demographic characteristics of the three study groups

	Group A (n=100)		Group C (n=100)		Group S (n=100)			
Variable	**Mean ± SD**	**Range**	**Mean ± SD**	**Range**	**Mean ± SD**	**Range**	**F(df=2 &297)**	**p-value**
Age (years)	23 ± 3	13 – 33	23 ± 3	16 – 32	23 ± 3	16 – 31	0.048	.953
BMI (kg/m2)	23.4 ± 2.5	18 – 20.7	22.8 ± 2.8	17.5 – 28.9	23.4 ± 2.7	16 – 29.1	1.994	.138
GA (weeks)	39.9 ± 1.3	38 – 42	39.9 ± 1.0	38 – 42	39.8 ± 1.0	38 – 42	0.019	.982

There was no statistically significant difference among the groups as regards the perineal length, skin incision length, vaginal incision length, or post-incision angle (p-values,.924,.682,.865, and.313, respectively) as shown in table 2.

Table 2. Characteristics of the episiotomy incision in the three study groups

	Group A (n=100)		Group C (n=100)		Group S (n=100)			
Variable	**Mean ± SD**	**Range**	**Mean ± SD**	**Range**	**Mean ± SD**	**Range**	**F(df=2 &297)**	**p-value**
Perineal length (cm)	3.5 ± 0.5	2.1 – 5.1	3.5 ± 0.4	2.3 – 4.5	3.5 ± 0.5	2.1 – 4.4	.079	.924
Skin incision length (cm)	2.9 ± 0.7	1.3 – 5.8	3.0 ± 0.9	1.4 – 6.5	2.9 ± 0.8	1.6 – 5.8	.383	.682
Vaginal incision length (cm)	2.8 ± 0.6	1.6 – 5.3	2.8 ± 0.6	1.4 – 5.0	2.8 ± 0.7	1.5 – 5.3	.145	.865
Post-incision angle (degrees)	38 ± 8	8 – 54	37 ± 11	10 – 56	36 ± 10	8 – 55	1.165	.313

SD, standard deviation; F, F statistic; df, degrees of freedom.
One-way analysis of variance (ANOVA).
The overall incidence of OASIS was 5%, 17%, and 15% in Group A, Group C, and Group S, respectively. These differences were statistically significant (p-value,.015). Group A showed the least incidence of OASIS while group C and S showed no statistically significant differecnce as shown in table 3.

Table 3. Overall incidence of OASIS in the three study groups

	Group A (n=100)		Group C (n=100)		Group S (n=100)		p-value
Variable	**n**	**%**	**n**	**%**	**n**	**%**	
OASIS							**.015**
No OASIS of any grade	95	95.0%	83	83.0%	85	85.0%	
Grade 3 or 4 OASIS	5	5.0%	17	17.0%	15	15.0%	

It was found that 5% of the patients in Group A suffered Grade 3A perineal tear. Nine percent of the patients in Group C had Grade 3A perineal tear, 7% had Grade 3B perineal tear, and 1% had Grade 4 perineal tear. In Group S, 12% of the patients suffered Grade 3A perineal tear, 2% had Grade 3B perineal tear and 1% had Grade 4 perineal tear. These differences were statistically significant (p-value, 043) as shown in table 4.

Table 4. Incidence of various grades of OASIS in the three study groups

	Group A (n=100)		Group C (n=100)		Group S (n=100)			
Variable	**n**	**%**	**n**	**%**	**n**	**%**	**χ^2(df=1)**	**p-value**
OASIS grade							4.089	**.043**
No OASIS	95	95.0%	83	83.0%	85	85.0%		
Grade 3A perineal tear	5	5.0%	9	9.0%	12	12.0%		
Grade 3B perineal tear	0	.0%	7	7.0%	2	2.0%		
Grade 4 perineal tear	0	.0%	1	1.0%	1	1.0%		

Except for ipsilateral vaginal tear which showed a statistically significant difference among the three groups (26%, 14%, and 12% in Group A, group C, and Group S, respectively; p-value,.025), all groups were comparable as regards the incidence of other types of tears (all p-values >.05) as shown in table 5.

Table 5. Incidence of other types of tears in the three study groups

	Group A (n=100)		Group C (n=100)		Group S (n=100)		p-value
Variable							
Associated tears							
Ipsilateral vaginal tear	26	26.0%	14	14.0%	12	12.0%	**.025**
Contralateral vaginal tear	9	9.0%	8	8.0%	13	13.0%	.561
Periurethral tear	5	5.0%	10	10.0%	7	7.0%	.434
Cervical tear	5	5.0%	6	6.0%	7	7.0%	.953
Periurethral & ipsilateral vaginal tears	2	2.0%	0	.0%	0	.0%	.331
Periurethral & contralateral vaginal tears	0	.0%	0	.0%	1	1.0%	1.0
Cervical & ipsilateral vaginal tears	1	1.0%	0	.0%	0	.0%	1.0
Cervical & contralateral vaginal tears	1	1.0%	0	.0%	0	.0%	1.0

Forty nine percent of patients in Group A had associated tears compared with 38% in Group C and 40% in Group S. These differences were not statistically significant (p-value,.251) as shown in table 6

Table 6: Overall incidence of other tears in the three study groups

	Group A (n=100)		Group C (n=100)		Group S (n=100)		
Variable	**n**	**%**	**n**	**%**	**n**	**%**	**p-value**
Associated tears of any type							.251
No associated tears	51	51.0%	62	62.0%	60	60.0%	
Other associated tears	49	49.0%	38	38.0%	40	40.0%	

There was no statistically significant relation between the perineal length and occurrence of OASIS (p-value,.062).

The skin incision length and vaginal incision length were significantly higher in patients suffering from OASIS (p-values, <.001 and.011, respectively). On the other hand, the post-incision angle was significantly lower in patients suffering from OASIS compared with those without OASIS (p-value, <.001) as shown in table7

Table 7. Relation between episiotomy characteristics and OASIS

	No OASIS (n=263)		**OASIS (n=37)**				
Variable	**Mean ± SD**	**Range**	**Mean ± SD**	**Range**	**t**	**df**	**p-value**
Perineal length (cm)	3.5 ± 0.5	2.1 – 5.1	3.3 ± 0.5	2.1 – 4.3	1.872	298	.062
Skin incision length (cm)	2.8 ± 0.6	1.3 – 6.0	3.7 ± 1.4	2.0 – 6.5	-3.959	37.653	**<.001**
Vaginal incision length (cm)	2.7 ± 0.5	1.4 – 4.1	3.2 ± 1.0	1.6 – 5.3	-2.671	38.835	**.011**
Post-incision angle (degrees)	39 ± 8	11 – 56	26 ± 14	8 - 52	5.407	38.870	**<.001**

Type A scissors were associated with significantly lower risk for OASIS (RR, 0.33; 95% CI, 0.13 to 0.88; p-value;.027) with a number needed to treat (NNT) of 10 (95% CI, 5.5 to 55.5).

There was no statistically significant difference between Type C and Type S scissors (RR, 1.13; 95% CI, 0.60 to 2.14; p-value;.700) as shown in table 8.

Table 8. Relative risk and number needed to treat for occurrence of OASIS as referenced to Type S scissors

Parameter	*Type A scissors*	*Type C scissors*
Relative risk	0.33	1.13
95% CI	0.13 to 0.88	0.60 to 2.14
z statistic	2.212	0.385
p-value	0.027	0.700
NNT / NNH	NNT=10	NNH=50
95% CI	NNT 5.5 to 55.5	NNH 8.2 to NNT 12.3

*Referenced to Type S scissors.
NNT, number needed to treat (benefit); NNH, number needed to harm.

DISCUSSION

Anal sphincter injury which is third and forth degree perineal tear during delivery is the most common cause of fecal incontinence in women during childbearing period. Obstetricians prefer to perform the mediolateral type of episiotomy than the midline episiotomy, this is because mediolateral episiotomy is less likely to be complicated with OASIS **[16].**

If mediolateral episiotomy is performed to reduce incidence of anal sphincter injury, it should be performed with suitable angle enough to relieve pressure on the perineum and to avoid OASIS **[17].**

It was recommended that mediolateral episiotomy suitable angle should be around sixty degrees to avoid perineal tears[18].

It was found that mediolateral incision angle of episiotomy directed towards ischial tuberosity is sixty degrees angles and is clinically identical with the currently evaluated angle of sixty degrees [19].

It was concluded that ischial tuberosity can be used as a general reference to perform mediolataral episiotomy at angle around sixty degrees[20].

Different types of scissors have been used in cutting episiotomies such as straight , curved and angled scissors . It is thought that curved or angled scissors produce incision away from anal sphincter [21]**.**

The association between scissors types , different episiotomy characteristics and obstetric anal sphincter injury is a point of debate that needs to be studied **[22].**

In this work 3 arm randomized study was established to compare the prevalence of OASIS between episiotomies cut by angled, curved and straight scissors.

The study was performed on pregnant women attending the labour ward in Ain Shams University Maternity Hospitals during the period from September 2016 to September 2017. The age of participationg women ranged from 16 to 33 years among the three groups.

The mean of BMI is 23.4 years and the mean gestational age was 39.9weeks. In the current study there is no significance regarding age, BMI, previous miscarriages.

The study participants had perineal length ranging from 2.1cm to 5cm , skin incision length ranging from 1.3 cm to 5.8 cm and vaginal incison length ranging 1.6 to 5.3 cm.

No significant difference in perineal length , mean vaginal and skin incision length among the three groups.

There was no significant relation between perineal length of the woman and injury of the anal sphincter which agree with the results of **[23].** Vaginal and skin incision length were higher in women suffered OASIS compared to women without OASIS which agree with the results of **Freeman *et al.* [24].**

The post incision angle was about 40 degrees in cases of episiotomy cut at 60 degrees angle which agrees with **Kalis *et al.*** [25] who recommended the performance of mediolateral episiotomy at sixty degrees to have a post-suture angle away from the anal sphincter avoiding its injury.

We found that women suffered from OASIS had lower post suture angle compared to women without OASIS which agree with **Kalis *et al.*[26].**

Stedenfeldt *et al.*[27] stated that the association between scissors types, different episiotomy characteristics and obstetric anal sphincter injury is a point of debate that needs to be studied.

Swift *et al.*[28] established a study comparing episiotomy cut by straight and curved scissors showing no significance between rates of OASIS among the two groups which agree with the current study that showed no significant difference in the incidence of OASIS between straight and curved episiotomy.

Swant and Kumar [29] stated that angled braun stadler scissors are used to cut episiotomy away from the anus to reduce incidence of OASIS which was confirmed by this study which resulted that angled braun stadler scissors are of the least incidence of cases of OASIS among the three compared groups.

Regarding the relation between the used scissor and the incidence of the associated perineal tears including cervical tears, periurethral tears and contralateral tears, 49% of patients in Group A had associated tears compared with 38% in Group C and 40% in Group S. These differences were not statistically significant which agree with **Shafik *et al.* [30].**The current study results showed that ipsilateral vaginal tear were found in higher rates in women suffered from OASIS compared to women without OASIS. which disagree with **Swant and kumar [31].**

CONCLUSIONS AND RECOMMENDATIONS

As a conclusion using angled scissors in cutting mediolateral episiotomy results in less cases of Obstetric Anal Injury compared to cutting episiotomy by straight or curved scissors.

Also it was found that women suffered from OASIS had less post suture angle and higher vaginal and skin incision length compared to those who did not suffer OASIS.

As a result we recommend the use of angled scissors in cutting mediolateral episiotomy and to be cut at angle sixty to produce post-suture angle away from the anal sphincter.

For the results of this pilot study it should be extrapolated to the general obstetric population by performance of larger multicenteric study to verify the results of this study.

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