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Evaluation of the Episiotomy Scissors Attached with an Adjusted Angle Plate for Mediolateral Episiotomy on the Occurrence of Obstetric Anal Sphincter Injuries

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ABSTRACT

Objectives: To assess the rate of obstetric anal sphincter injuries (OASI) and the angle after repair following mediolateral episiotomy performed with episiotomy scissors attached with an adjusted angle plate

Materials and Methods: The study group comprises 153 primiparous women at 37-42 weeks of gestation delivered between December 2022 and July 2023 in the labor room, Taksin Hospital. Scissors with a 60-degree adjusted angle plate were applied. Suture angles were recorded on transparent sheet and analyzed. Before suturing, a rectal exam was done to check for OASI.

Results: Of 153 primiparous women were recruited into the present study, the mean gestational age was 38.56 ± 1.06 weeks, the mean birthweight was 2,990.82 ± 327.39 grams. The mean post-suturing episiotomy angles were 44.92 ± 5.88 degrees (95 % confidence interval 44-45.9). The change in angle decreased from before cutting by 15.07±5.88 degrees. No cases of OASI were detected.

Conclusion: During childbirth, mediolateral episiotomy is performed using scissors attached to a 60-degree adjusted angle plate to cut the perineum. The mean perineal angle after suture repair was 44.9 degrees, a decrease of 15 degrees. No anal sphincter injury was detected.

Keywords: episiotomy scissors, adjusted angle plate, mediolateral episiotomy, obstetric anal sphincter injuries.

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การประเมินผลของการใช้กรรไกรตัดฝีเย็บที่ติดแผ่นปรับมุมในการตัดฝีเย็บจากกึ่งกลางไปด้านข้างต่อการเกิดการฉีกขาดของหูรูดทวารหนักทางสูติกรรม

เพียงจิตต์ วิรัชพงศานนท์, สุนิดา ชัยติกุล

บทคัดย่อ

วัตถุประสงค์*: เพื่อศึกษาอัตราการฉีกขาดของหูรูดทวารหนักทางสูติกรรมและมุมหลังเย็บซ่อมฝีเย็บจากการใช้กรรไกรตัดฝีเย็บที่ติดแผ่นปรับมุม*

วัสดุและวิธีการ*: สตรีตั้งครรภ์เดี่ยวอายุครรภ์ระหว่าง 37 ถึง 42 สัปดาห์ ที่ไม่เคยคลอดบุตรทางช่องคลอดมาก่อน จำนวน 153 ราย ที่มาคลอดที่ห้องคลอดโรงพยาบาลตากสินระหว่างเดือนธันวาคม 2565 ถึงเดือนกรกฎาคม 2566 จะได้รับการตัดมุมฝีเย็บ 60 องศา แบบเฉียงออกไปด้านข้างด้วยกรรไกรที่ปรับทำมุมไว้แล้ว วัดมุมหลังเย็บซ่อมฝีเย็บด้วยแผ่นพลาสติกใสเพื่อนำไปวิเคราะห์ และทำการตรวจทางทวารหนักเพื่อประเมินการฉีกขาดของหูรูดทวารหนักก่อนเย็บทุกราย*

ผลการศึกษา*: สตรีตั้งครรภ์ 153 ราย ที่ได้รับการตัดฝีเย็บด้วยมุม 60 องศา พบว่ามีอายุครรภ์เฉลี่ยอยู่ในช่วง 38.56 ± 1.06 สัปดาห์ น้ำหนักทารกแรกเกิดเท่ากับ 2,990.82 ± 327.39 กรัม ค่าเฉลี่ยของมุมฝีเย็บหลังเย็บซ่อมแซมเท่ากับ 44.92±5.88 องศา (95% confidence interval 44-45.9) มีการเปลี่ยนแปลงของมุมลดลงจากก่อนตัดฝีเย็บ 15.07±5.88 องศา ไม่พบสตรีตั้งครรภ์ที่มีการฉีกขาดของหูรูดทวารหนักทางสูติกรรม*

สรุป*: การตัดฝีเย็บขณะคลอดด้วยกรรไกรที่ติดแผ่นปรับทำมุม 60 องศา ให้เฉียงออกไปด้านข้างจากกึ่งกลาง พบค่าเฉลี่ยของมุมฝีเย็บหลังเย็บซ่อมแซมเท่ากับ 44.9 องศา ลดลง 15 องศา ไม่พบการเกิดการบาดเจ็บของกล้ามเนื้อหูรูดทวารหนัก*

คำสำคัญ*: กรรไกรตัดฝีเย็บ, แผ่นยึดติดที่ปรับมุมได้, การตัดฝีเย็บเฉียงออกไปด้านข้างจากกึ่งกลาง, การบาดเจ็บของกล้ามเนื้อหูรูดทวารหนักทางสูติกรรม*

Introduction

Obstetric anal sphincter injuries (OASI) are reported in 0.5-15% of vaginal deliveries[1, 2], especially operative vaginal delivery, which increases the risk of OASI[3, 4]. As a result, 30-50 percent of these women are afflicted with anal incontinence, fecal urgency, dyspareunia, and perineal pain[1, 5-8]. There were also studies indicating that Asian women were statistically significant to have OASI than Caucasian women, and fourth-degree OASI births were significantly higher even though they bore smaller newborns[9, 10]. Asian races are considered an independence risk to oasis[9, 10]. This could be attributed to various factors such as having a shorter perineal body, a smaller pelvic inclination and different perineal muscle support[11]. Another contributing factors could be racial differences in skin thickness and resistance to mechanical stretch[12]. Therefore, prevention is important.

If the incision angle is adequate, mediolateral episiotomy is linked to a lower risk of OASI[10]. Eogan M, et al[13] conducted a case-control study in primiparous women who had undergone right mediolateral episiotomy 3 months previously. The mean angle of episiotomy scar from the midline in cases with OASI was 30 degrees, while the controls without OASI were 38 degrees. An analysis revealed that for every 6 degrees away from the midline, there was a 50% relative decrease in the risk of experiencing a third-degree tear[13].

During delivery, the perineal tissue will expand and swell, resulting in a greater incisional angle for mediolateral episiotomy compared to the suture angle after repair. In 2008, Vladimir K, et al[14] revealed that the angle of a mediolateral episiotomy formed by the midline and the incision was 40 degrees and the median angle of the suture line after delivery was found to be 20 degrees.

A study conducted by Wiruchpongsanon P, et al[15] in 2013 focused on 70 primiparous women who had a mediolateral episiotomy of 60 degrees during the crowning of their baby's head. The results showed that the average suture angle was 42 degrees with a change of angle of 18 degrees.

According to Stedenfeldt, et al[16] scarred episiotomy with angle range of 30-60 degrees are significantly associated with less risk of OASI. But observed by van Dillen, et al[17], the mean angle of episiotomy was 38.6° ± 7.8° immediately after delivery and 31.2° ± 11.5° at the postnatal check-up. That means the mean suture angle immediately after delivery should be about 40-70 degrees or the angle of mediolateral episiotomy during the crowning of the baby's head should be at least 60-90 degrees. Therefore, Episcissors-60 are invented to achieve a mediolateral cut at 60 degrees to the perineal midline. Based on a systematic review of five studies[18], it has been discovered that using Episcissors-60 can decrease the occurrence of OASI by 50%. Furthermore, in all of the studies, the angle measured after repair was greater than 40 degrees. Unfortunately, the cost of £400 for the Episcissors-60 is too high for a developing country.

In Thailand, Thanapongpibul, et al[19] invented Episioguide to assist in cutting the perineum at a 60-degree angle. They conducted a randomized controlled trial and found that the mean postsuture angle was 34.636° ± 9.445° in the Episioguide group, while it was 27.614° ± 9.267° in the group that followed the standard procedure.

At Taksin Hospital, midwives, nurse teachers, and medical students handle uncomplicated deliveries using routine mediolateral episiotomy. Obstetricians only handle cases requiring obstetric procedures. A new adjusted angle plate has been developed by researcher that can be attached to standard perineal scissors used during childbirth. This plate can be adjusted to angles between 60 and 90 degrees, making it useful for nurses, medical students, nursing teachers, and obstetricians during deliveries. It is particularly useful in situations where an obstetric procedure is required, and there is a higher risk of OASI. The perineum needs to be cut at an angle greater than 60 degrees in such cases. The research study set the cutting angle at 60 degrees, which is considered the least risky angle for obstetric rectal sphincter tearing compared to higher angles. This

study aimed to evaluate the use of perineal scissors fitted with a 60° adjusted angle plate to evaluate the incidence of OASI and whether the post-suture angle is in a safe range or not.

Materials and Methods

This uncontrolled experimental study was approved by Bangkok Metroplitan Administration (BMA) Human Research Ethics Committee (certificate number: S013h/65). The sample size was calculated according to the estimated prevalence of OASI of 10% with acceptable error of 5% at 95% significant level. Allowing for 10% missing data, we had to recruit a total of 153 women. Data was collected from December 2022 to July 2023.

The inclusion criteria were for uncomplicated singleton pregnancies of nulliparous women, 20 years old or older, between 37-42 weeks of gestation, with the fetus in cephalic presentation and vaginal delivery planned. The exclusion criteria for our study were women who had undergone operative vaginal delivery, women with prior surgical scarring of the perineum, women who declined to participate, and fetuses in a persistent occipitoposterior position.

The episiotomy was performed by nurse with at least 3 years of experience in the delivery room of Taksin Hospital. They were trained to use an adjusted angle plate.

Researcher collaborated with engineers and technicians computer numerical control (CNC) to create the adjusted angle plate. It was crafted from stainless steel 304, a material commonly used in medical equipment due to its high resistance to corrosion and ability to withstand temperatures up to 1,400 degrees Celsius without rusting. The adjusted angle plate will have an axis for plugging in and selecting the desired angle, ranging from 60 to 90 degrees. To use the adjusted angle plate, first, align the circle point on the plate with the pivot point of the perineal scissors. After that, lock the handle of the adjusted angle plate to the handle of the scissors handle. (Fig. 1, 2)

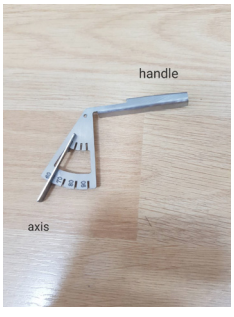

Fig.1. The adjusted angle plate

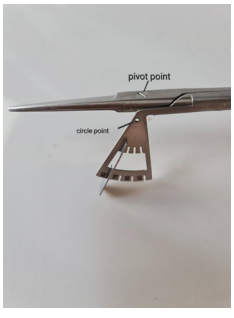

Fig. 2. Align the circle point on the plate with the pivot point of the perineal scissors

In perineal cutting, the axis of the angle-adjusting plate is the reference point with the end of the axis pointing towards the anus. The scissors will be at the angle that we have adjusted. (Fig. 3)

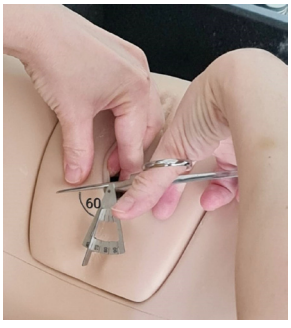

Fig. 3. The axis of the angle-adjusting plate is the reference point with the end of the axis pointing towards the anus.

Perineum was cut when crowning of the baby's head. The adjusted angle plate is located on the outer part of the scissors, which ensures that pregnant women's perineum is not harmed during use.

Only one researcher performed a perineum examination after delivery to detect OASI before suturing. Examination consists of inspection of perineum with labial parting, the distal posterior vagina and for a third-degree tear behind an intact perineum. Palpation is done with the examiner's index inserted in the anus, and the ipsilateral thumb in the vagina. The 2 fingers then palpate with a "pill-rolling" motion to assess thickness. OASI is defined as any type of injury to the anal sphincter muscle, including 3A, 3B, 3C, and 4th-degree perineal tears, based on the classification originally described by Sultan AH, et al[20].

First degree: laceration of the vaginal epithelium or perineal skin only

Second degree: involvement of the perineal muscles but not the anal sphincter

Third degree: disruption of the anal sphincter muscles, further subdivided into:

3a: < 50 percent thickness of external sphincter torn

3b: > 50 percent thickness of external sphincter torn

3c: internal sphincter torn also

Fourth degree: a third-degree tear with disruption of the anal epithelium

Following the repair, while the patient was in the lithotomy position with their leg flexed at the hip joints at an angle ranging from 90 to 100 degrees. Another nurse, who was not involved in the delivery of the baby, used a translucent plastic sheet to draw a line indicating the angle with the midline and the length of the incision. The researcher used a protractor to measure all variables.

Data was entered into a Microsoft Excel database and analyzed to compute basic statistics including mean, standard deviation, and 95% confidence interval.

Results

A total 153 uncomplicated, singleton, nulliparous pregnant women, 20 years old or older between 37-42 weeks of gestation were enrolled. The characteristics are summarized in Table 1.

All episiotomies were performed at 60 degrees. Mean episiotomy and perineal length were 3.13 and 3.59 cm. The mean post-suturing episiotomy angles were 44.92 ± 5.88 degrees (95% confidence interval 44-45.9). The change in angle decreased from before cutting by 15.07 degrees. No cases of OASI were detected (Table 2).

Table 1. Baseline characteristics of 153 women who underwent 60 degrees mediolateral episiotomy.

Characteristics	mean ± standard deviation
Mean maternal age (years)	24.19 ± 3.61
Mean gestational age (weeks)	38.56 ± 1.06
Median duration of the 2nd stage of labor (min)	19.80 ± 11.78
Mean birth weight (g)	2,990.82 ± 327.39

Table 2. Outcome of 153 women who underwent 60 degrees mediolateral episiotomy.

Outcome	mean ± standard deviation
Suture angle of episiotomy	44.92 ± 5.88
Change of angle	15.07 ± 5.88
Length of the episiotomy (cm)	3.13 ± 0.45
Distance from anal canal (cm)	3.59 ± 0.78

Discussion

In this study, the perineum was cut at a 60-degree angle with the aid of an angle adjustment plate. The results indicated that the mean angle after suturing was 44.9 degrees, which was similar to the findings of using the Episcissor-60[21-23]. As we know, the accuracy of the episiotomy angle is important for the prevention of OASI. Based on a study conducted by Eogan M, et al[13], it was found that the group without OASI had a suture angle of 38 degrees. Additionally, there was a minimum incidence of OASI at 0.5% when the suture angle was 43 degrees. Additionally, a study by Stedenfeldt M, et al[16] found that scarred episiotomy with an angle range of 30-60 degrees were significantly associated with a lower risk of OASI. The angle obtained from this study falls within the range that can prevent OASI.

To minimize measurement bias, another nurse, who was not involved in the delivery of the baby, measured the suture angle using a translucent plastic sheet. The researcher then measured the angle according to standard measurement practices using a protractor, after placing the translucent plastic sheet on a flat surface.

One limitation of this study was the absence of randomized controlled trials comparing it with standard episiotomy scissors. Although this study did not report any cases of OASI, it did not provide evidence of a decrease in the rate of OASI.

The reason why a comparison group with conventional perineal scissors was not included in this study was due to the ethics committee's concern for the safety of pregnant women and their potential risk for OASI exposure. A previous study by Andrews V, et al[23] revealed that only 22% of doctors performed mediolateral episiotomy at the recommended angle of 40 to 60 degrees, and none of the midwives did. The researchers also observed that delivery room nurses performed a suture angle of no more than 25 degrees.

In comparison to the Episioguide study[19], which was a randomized controlled trial, the lack of a control group in this study reduced its reliability. This study was performed in primiparous women, eliminating the effect of scar on repair suture angle, which was an advantage over the Episioguide study performed in singletons. When using the Episioguide, it is important to place it on the perineum. However, this may cause difficulties for individuals with a short perineal body or if the perineum is swollen, as the

Episioguide's shank is 4 cm long. Additionally, the instrument cannot adjust to the perineum's extension caused by the child's head pushing. The adjusted angle plate used in this study is easy to operate. All you need to do is adjust the handle to fit the size of the outer scissors handle used at each hospital. Then you can use it to cut like normal perineal scissors. Upon comparison of the two studies, it was discovered that the angle obtained after perineum suture repair using the adjusted angle plate was 44.9 degrees, which was better than the 34.6 degrees achieved using episioguide. In terms of pricing, the reusable Episioguide costs 400 baht, while the prototype of the adjusted angle plate is priced at 450 baht per piece. However, subsequent orders will be priced at 225 baht per piece. The plate can be sterilized using an autoclave and reused multiple times. In addition, the adjusted angle plate can be set to any angle between 60 and 90 degrees, making it more versatile and cost-effective.

According to our research, the utilization of an adjusted angle plate permitted post-suture angles to vary between 40 and 60 degrees. Women can prevent physical and emotional health issues and avoid OASI, which saves costs. In the UK, fixing an OASI can cost up to £48.75 million per year[20]. This instrument is appropriate for usage in hospitals that perform mediolateral episiotomy. It is appropriate for medical students and nurses, especially obstetricians who must perform operative vaginal deliveries because procedures carry a higher risk of OASI, but research has shown that there is a 50% relative decrease in the risk of experiencing a third-degree tear for every 6 degrees away from the midline[13]. The tool may also be used to practice doing an episiotomy in order to learn and become accustomed to the proper incision angle. After practicing with the tool and conducting further studies on the results, if they are good, it will be promoted for use in other hospitals. In the future, a video demonstrating the use of an adjusted angle plate for perineal cutting may be sent to multiple hospitals. If any hospital is interested in ordering an adjustable angle plate, they can contact us. It should be approached from a different angle of mediolateral episiotomy in future research and in a wider range of demographics, such as normal deliveries and operative vaginal deliveries, including evaluating patient pain and user satisfaction.

Conclusion

Based on the study, it was discovered that scissors with an adjusted angle plate can be highly effective. The study showed that the mean angle after suturing was 44.9 degrees for mediolateral episiotomy without OASI. It is also an affordable option.

Acknowledgments

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Potential conflicts of interest

The authors declare no conflicts of interest.

References

1. Sultan AH, Kamm MA, Hudson CN, Bartram CI. Third degree obstetric anal sphincter tears: risk factors and outcome of primary repair. BMJ 1994;304:887-91.
2. Walsh CJ, Mooney EF, Upton GJ, Motson RW. Incidence of third-degree perineal tears in labour and outcome after primary repair. Br J Surg 1996;83:218-21.
3. Andrews V, Sultan AH, Thakar R, Jones PW. Risk factors for obstetric anal sphincter injury: a prospective study. Birth 2006;33:117-22.
4. Klokk R, Bakken KS, Markestad T, Holten-Anderson MN. Modifiable and non-modifiable risk factors for obstetric anal sphincter injury in a Norwegian Region: a case-control study. BMC Pregnancy Childbirth 2022;22:277-83.
5. Fitzpatrick M, Behan M, O'Herlihy C. A randomized clinical trial comparing primary overlap with approximation repair of third-degree obstetric tears. Am J Obstet Gynecol 2000;183:1220-4.
6. de Leeuw JW, Vierhout ME, Struijk PC, Hop WCJ, Wallenberg HCS. Anal sphincter damage after vaginal delivery: functional outcome and risk factors for fecal

incontinence. Acta Obstet Gynecol Scand 2001;80: 830-4.
7. Williams A. Third-degree perineal tears: risk factors and outcome after primary repair. J Obstet Gynecol 2003;23:611-4.
8. Dee EF, Becky G, Pavna B, Lorri M, John OLD. Fecal and urinary incontinence after vaginal delivery with anal sphincter disruption in an obstetrics unit in the United States. Am J Obstet Gynecol 2003;189:1543-50.
9. Baruch Y, Gold R, Eisenberg H, Amir H, Reicher L, Yogev Y. High incidence of obstetric anal sphincter injuries among immigrant women of Asian ethnicity. J Clin Med 2023;12:1044-50.
10. Albar M, Aviram A, Anabusi S, Huang T, Tunde-Byass M, Mei-Dan E. Maternal ethnicity and the risk of obstetrical anal sphincter injury: a retrospective cohort study. Obstetrics 2021;43:469-73.
11. Rizk DE, Czechowski J, Ekelund L. Dynamic assessment of pelvic floor and bony pelvis morphologic condition with the use of magnetic resonance imaging in a multiethnic, nulliparous, and healthy female population. Am J Obstet Gynecol 2004;191:83–9.
12. Muizzuddin N, Hellemans L, Van Overloop L, Corstjens H, Declercq L, Maes D. Structural and functional differences in barrier properties of African American, Caucasian and East Asian skin. J Dermatol Sci 2010;59:123–8.
13. Eogan M, Daly L, O'Connell PR, O'Herlihy C. Does the angle of episiotomy affect the incidence of anal sphincter injury? BJOG 2006;113:190-4.
14. Vladimir K, Karbanova J, Horak M, Lobovsky L, Kralickova M, Rokyta Z. The incision angle of mediolateral episiotomy before delivery and after repair. IJGO 2008;103:5-8.
15. Wiruchpongsanon P, Maharungruengrat A. Incidence of obstetric anal sphincter injuries by 60 degrees for the incision angle of mediolateral episiotomy before delivery. Thai J Obstet Gynaecol 2013;21:95-100.
16. Stedenfeldt M, Pirhonen J, Blix E, Wilsgaard T, Vonen B, Oian P. Episiotomy characteristics and risks for obstetric anal sphincter injuries: a case-control study. BJOG 2012;119:724-30.
17. van Dillen J, Spaans M, van Keijsteren W, van Dillen M, Vredevoogd C, van Huizev M, et al. A prospective multicenter audit of labor-room episiotomy and anal sphincter injury assessment in the Netherlands. Int J Gynecol Obstet 2010;108:97-100.
18. Cole J, Lacey L, Bulchandani S. The use of Episcissors-60 to reduce the rate of obstetric anal sphincter injuries: a systematic review. Eur J Obstet Gynecol Reprod Biol 2019;237:23-7.
19. Thanapongpibul C, Suksamarnwong M. Effects of Episioguide - a 60º mediolateral episiotomy guide device – on post suture episiotomy angle: a randomized controlled trial. Thai J Obstet Gynaecol 2022;30:7-14.
20. Sultan AH. Obstertric perineal injury and anal incontinence. Clin Risk 1999;5:193-6.
19. Freeman RM, Hollands, Barron LF, Kapoor DS. Cutting a mediolateral episiotomy at the correct angle: evaluation of a new device, the Episcissors-60. Med Devices Evid Res 2014;7:23-8.
21. Patel RP, Ubale SM. Evaluation of the angled Episcissors-60 episiotomy scissors in spontaneous vaginal deliveries. Med Devices Evid Res 2014;7:253-6.
22. Cole J, Lacey L, Bulchandani S. The use of Episcissors-60 to reduce the rate of obstetric anal sphincter injuries: a systematic review. Eur J Obstet Gynecol Reprod Biol 2019;237:23-7.
23. Andrews V, Thakar R, Sultan AH, Jones PW. Are mediolateral episiotomies actually mediolateral? BJOG 2005;112:220-4.