

USE OF TRANSPERINEAL ULTRASONOGRAPHY TO STUDY THE EFFECT OF DELIVERY AND EPISIOTOMY ON ANAL SPHINCTER IN WOMENRooplekha Chauhan¹, Sachin Gothi², Vikram Chauhan³, Namrata Chauhan⁴, Rowena Walker⁵**HOW TO CITE THIS ARTICLE:**

Rooplekha Chauhan, Sachin Gothi, Vikram Chauhan, Namrata Chauhan, Rowena Walker. "Use of Transperineal Ultrasonography to Study the Effect of Delivery and Episiotomy on Anal Sphincter in Women". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 23, June 09; Page: 6496-6503, DOI: 10.14260/jemds/2014/2771

ABSTRACT: Parturition has profound effect on the pelvic floor muscles and is associated with mechanical or neurological injuries. In most women, this effect is transitory, however in a few, permanent damage occurs in the form of urinary or fecal incontinence, fistulae, and sexual problems. Often very little attention is paid on to these problems postnatally and few women volunteer to inform about these. Therefore, the true incidence of the problem is unknown. We conducted a study to correlate the various risk factors with the degree of perianal injury caused by the mode of delivery and episiotomy on the anal sphincter. Until recently, defects of external anal sphincter (EAS) were detected by electromyography and internal anal sphincter (IAS) by measurement of low resting anal pressure. This study uses the transperineal ultrasonography (TPUS). TPUS assesses the anal sphincter under more physiological condition with no intra anal probe like anal endosonography so also demonstrate the internal anal cushion (mucosa & submucosa) of the resting canal. TPUS gives accurate images of both sphincter muscles, leading to recognition of unsuspected defects of external & internal sphincter.

KEYWORDS: TPUS, Anal Sphincter, USG.

INTRODUCTION: Parturition has profound effect on the pelvic floor muscles and is associated with mechanical or neurological injuries. In most women, this effect is transitory, however in a few, permanent damage occurs in the form of urinary or fecal incontinence, fistulae and sexual problems. Often very little attention is paid on to these problems postnatally and few women volunteer to inform about these. Therefore, the true incidence of the problem is unknown. We conducted a study to correlate the various risk factors with the degree of perianal injury caused by the mode of delivery and episiotomy on the anal sphincter.

Until recently, defects of external anal sphincter (EAS) were detected by electromyography and internal anal sphincter (IAS) by measurement of low resting anal pressure. This study uses the transperineal ultrasonography (TPUS). TPUS assesses the anal sphincter under more physiological condition with no intra anal probe like anal endosonography so also demonstrate the internal anal cushion (mucosa & submucosa) of the resting canal. TPUS gives accurate images of both sphincter muscles, leading to recognition of unsuspected defects of external & internal sphincter.

AIMS AND OBJECTIVES

- To find the prevalence and severity of postpartum anal sphincter injury, with Transperineal Ultra Sonography (TPUS).
- To identify maternal and obstetric risk factors for Sphincter injury.

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MATERIALS AND METHODS: This was a prospective study on total 40 registered antenatal patients including 20 primigravida & 20 multigravida in third trimester who gave consent for the same patient with pre-existent anal sphincter injury, previous anal surgery and Marfan's syndrome were excluded. Variables included in the study:

- I. Peripartum data.
 - a. Primipara Vs. Multipara
 - b. Birth weight and size of the baby
 - c. Duration of labour (Partogram based)
 - d. Intervention in active phase.
 - e. Method of delivery (Vaginal Vs. Caesarean section).
 - f. If, Caesarean section, Elective Vs. Emergency.
 - g. Perineal tear, degree of tear & its management.

II. Transperineal volume of Perianal sphincter.

Methods of collection of Data:

- a. Questionnaire
- b. Clinical assessment
- c. TPUS: I- Antenatal.
II - Six week postpartum.

Postcards and telephonic reminder were given for follow up. Postpartum incontinence scale used was that proposed by George and Wexner. A Score of zero implies complete continence & score of 20 complete incontinence.

Cut off Score is six.

	SYMPTOMS	0 Never	1 Rarely (<1/month)	2 Sometimes (1/wk-1/mth)	3 Usually (1/d-1/wk)	4 Always (>1/day)
1	Passage of any flatus when socially undesirable					
2	Any incontinence of liquid stool					
3	Any need to wear a pad because of anal symptoms					
4	Any incontinence of solid stool					
5	Any fecal urgency (inability to defer defecation for more than 5 minutes)					

Method of TPUS: TPUS was performed with Siemens Sonaline G-50 machine using a liner array transducer type L10-5, a 5-10 MHz linear array transducer operating at the highest frequency. Patient was placed in dorsal position with partially abducted, semi-flexed legs. The probe was positioned on midperineum, oriented backward at a 45-degree angle to get transverse images of anal canal.

The normal internal anal sphincters (IAS), is approximately 3-mm thick hypoechoic inner black band surrounding the more echogenic rectal mucosa. External anal sphincters (EAS), is 5mm thick and has of mixed echogenicity, with a white layer deficient anteriorly & superiorly. A round hyperechoic (intersphincteral space) is present between IAS & EAS.

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Recorded images were printed on paper and antenatal & postnatal images were compared.



Thickness of EAS & IAS was measured in four quadrants 12, 3, 6, 9 o'clock positions; defect could be partial or full thickness. Reductions in thickness of all the four quadrants were measured according to following formula.

$$\text{External Sphincter \% reduction} = \frac{\text{ANC} - \text{PNC}}{\text{ANC}} \times 100$$

$$\text{Internal Sphincter \% reduction} = \frac{\text{ANC} - \text{PNC}}{\text{ANC}} \times 100$$

OBSERVATIONS: In the present study, 40 antenatal patients were enrolled. Out of 40 patients 20 (50%) patients were nulliparous, were as 20 (50%) were multiparous. The mean age of the patients was 25.43 years.

TPUS was done in 3rd trimester.

The mean thickness of external sphincter in the four quadrants at 12, 3, 6 and 9 o'clock positions (in mm) in case of nulliparous patients were 4.36, 4.73, 4.79 and 4.77 respectively with an average of 4.66 mm, were as in case of multiparous patients the measurements were 3.49, 4.03, 4.00 and 4.00 respectively with an average of 3.88 mm.

The mean thicknesses of internal sphincter in the four quadrants in primiparous patients were 2.82, 2.97, 2.90 and 3.00 respectively with an average of 2.92 mm whereas in case of multiparous patients the measurements were 2.81, 3.00, 2.99 and 3.00 with an average of 2.95 mm.

Mean Thickness (In mm)	Parity	12 o'clock	3 o'clock	6 o'clock	9 o'clock	Average
EAS	Primipara	4.36	4.73	4.79	4.77	4.60
	Multipara	3.49	4.03	4.00	4.00	3.80
IAS	Primipara	2.88	2.97	2.90	3.00	2.92
	Multipara	2.81	2.00	2.99	3.00	2.95

Partogram was maintained to monitor the progress of labour.

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Mode of delivery – Cross tabulation:

		Mode of delivery			Total
		FTND	Elective LSCS	Emergency LSCS	
O/H	Primipara	13	6	1	20
	para2 or more	17	3		20
Total		30	9	1	40

- All Primiparous patient with vaginal deliveries, delivered with the help of mediolateral episiotomy. None had perineal tear or extension of episiotomy. Emergency LSCS was taken for non-progress of labour.
- Among multiparous patients, five delivered with episiotomy & 12 patients without episiotomy, Out of which one sustained II degree perineal tear which was repaired.

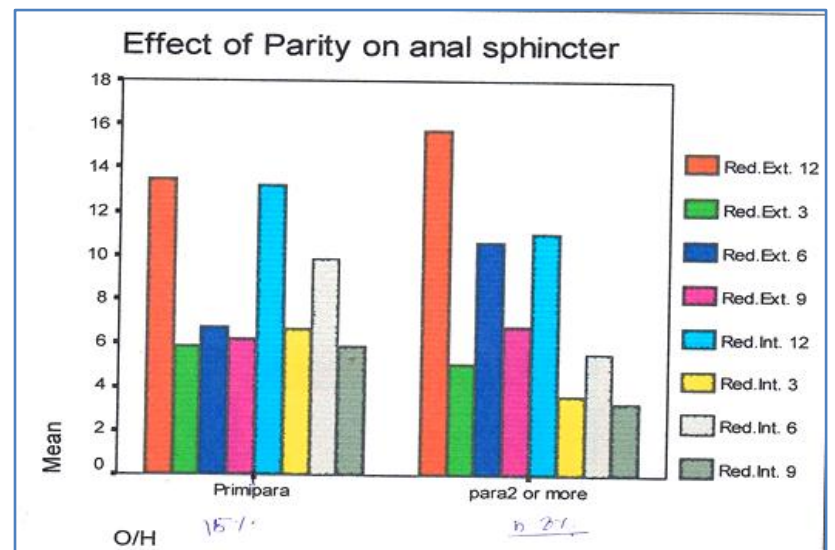
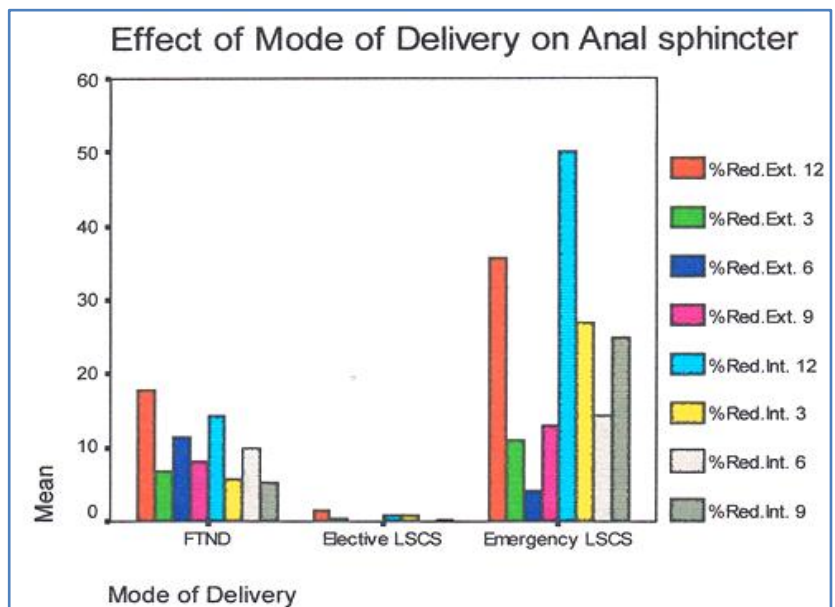
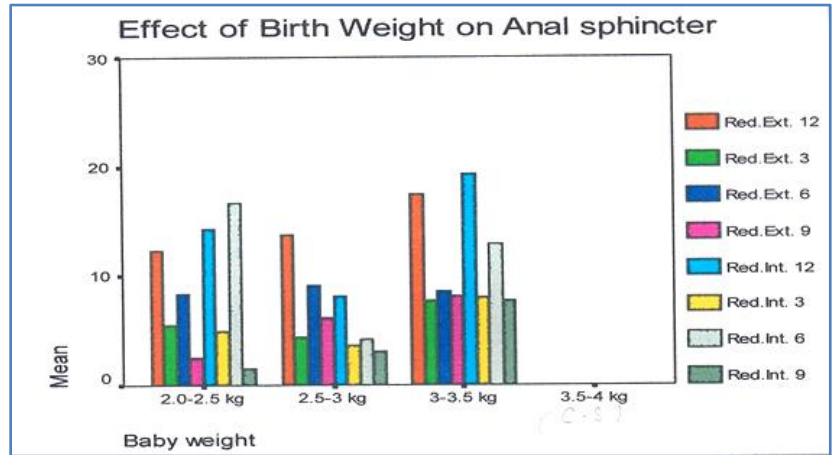
TPUS done any time after 6 weeks when patient came for follow up and measurements were compared.

Patients who underwent elective LSCS - in primiparous no change in thickness of EAS, While among three multiparous pts one had mean reduction of 4.8% in EAS & 4.5% in IAS, no change in rest two patients.

		Parity	12 o'clock	3 o'clock	6 o'clock	9 o'clock	Average
EAS	Primipara with vaginal delivery ⁽¹³⁾	Mean thickness (mm.)	3.8	4.46	4.50	4.48	4.31
		Reduction (%)	19	9.46	12.31	9.36	12.51
	Primipara with emergency LSCS ⁽¹⁾	Mean thickness (mm.)	2.7	4.0	4.5	4.0	3.8
		Reduction (%)	35.7	11.11	4.25	13	16
	Multipara with episiotomy (5)	Mean thickness (mm.)	2.6	3.44	3.08	3.38	3.15
		Reduction (%)	17.38	7.64	13.	8.4	11.61
	Multipara without episiotomy (12)	Mean thickness (mm.)	2.8	4.14	3.53	3.65	3.53
		Reduction (%)	19.43	5.3	14	7.58	11.58

		Parity	12 o'clock	3 o'clock	6 o'clock	9 o'clock	Average
IAS	Primipara with vaginal delivery (13)	Mean thickness (mm.)	2.45	2.78	2.62	2.82	2.67
		Reduction (%)	13.25	6.69	9.88	5.91	8.93
	Primipara with emergency LSCS (1)	Mean thickness (mm.)	1.5	1.9	1.8	2.4	1.9
		Reduction (%)	50	26.9	14.3	25	29
	Multipara with episiotomy (5)	Mean thickness (mm.)	2.82	2.98	3.0	3.1	2.97
		Reduction (%)	7.96	4.87	6.37	6	6.27
	Multipara without episiotomy (12)	Mean thickness (mm.)	2.25	3.0	2.7	2.98	2.75
		Reduction (%)	13.88	2.83	6.93	3.24	6.72

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Image 1: Shows the transperineal sonography of the anal sphincter of a second gravida patient. Internal and External sphincters are visible.



Image 1

Image 2: Shows the transperineal sonography of the same patient 6 weeks postpartum. Anteriorly disruption of external sphincter seen. The patient delivered without episiotomy and had second degree perineal tear due to deflexion of head of the baby at the time of delivery.



Image 2

DISCUSSION: IAS is under autonomic control and not under voluntary control. It contributes 70% to resting anal sphincter complex tone. It is invariably damaged in IV degree laceration but may also be damaged without overt disruption of rectal mucosa. Damage of IAS is much more predictive of severe fecal incontinence symptoms than damage to EAS.

EAS is under voluntary control but also contributes 25% to resting anal sphincter tone. It is deficient anteriorly so anterior position of the EAS (12o' clock) is invariably torn in obstetrical injuries EAS is intimately associated with puborectalis part of levator ani and serves to maintain voluntary continence.

In the present study:

- None of the patient suffered from III or IV degree tear.
- Two of the thirteen primiparous patient (15%) who had delivered vaginally suffered from significant reduction in both EAS & IAS at 12o'clock position. 5(25%) primiparous patient developed frequent complaints of flatus incontinence or urgency while another 7 (35%) had occasional symptoms.
- Six (30%) out of twenty multiparous patient had obvious defect of EAS & reduced diameters of EAS & IAS before delivery. five out of seventeen multiparous patient were already suffering from occasional episode of flatus incontinence & two were suffering from frequent episodes.
- One of the twenty multiparous patients developed IInd degree perineal tear & frequent episode of flatus incontinence & urgency to defecate. Additional seven patients (35%) suffered mild urgency flatus incontinence after this delivery.
- None of the patients in the study had faecal incontinence.
- None of the six primiparous & two multiparous patients who had elective LSCS suffered any reduction in the diameters, or change in bowel the habits. One of the multiparous patients who had elective LSCS in the present pregnancy had pervious LSCS for non-progress of labour & already had mild urgency but did not suffered any further.
- One of the primiparous patients who underwent emergency LSCS for non-progress of labour had significant anal sphincter injury both EAS & IAS.

CONCLUSION:

- TPUS provides high-resolution images of the anal sphincter and can be a useful tool in detecting occult anal sphincter injury.
- The most common site of injury is anterior position.
- Risk factors of the anal injury are primiparous state, emergency LSCS, prolonged labor, use of forceps, big size baby, and deflexion of the fetal head.
- Elective LSCS certainly prevents the injury but may not prevent the development of the symptoms.

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AUTHORS:

1. Rooplekha Chauhan
2. Sachin Gothi
3. Vikram Chauhan
4. Namrata Chauhan
5. Rowena Walker

PARTICULARS OF CONTRIBUTORS:

1. HOD, Department of Obstetrics and Gynaecology, NSCB Medical College, Jabalpur.
2. Post Graduate, Department of Obstetrics and Gynaecology, NSCB Medical College, Jabalpur.
3. Post Graduate, Department of Obstetrics and Gynaecology, NSCB Medical College, Jabalpur.
4. Post Graduate, Department of Obstetrics and Gynaecology, NSCB Medical College, Jabalpur.
5. Senior Resident, Department of Obstetrics and Gynaecology, NSCB Medical College, Jabalpur.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Rowena Walker,
#1330, Diwanbada,
P. O-Westland,
Khamaria, Jabalpur-4820005, M. P.
E-mail: dr.r.chauhan02@gmail.com
rowe_eagle@yahoo.com

Date of Submission: 16/05/2014.
Date of Peer Review: 17/05/2014.
Date of Acceptance: 28/05/2014.
Date of Publishing: 09/06/2014.