

DIFFERENTIAL CHANGES IN ELECTROMYOGRAPHIC PATTERNS OF THE PUBORECTALIS AND EXTERNAL ANAL SPHINCTER MUSCLES IN WOMEN WITH SYMPTOMATIC PELVIC FLOOR INJURY.

Aims of Study

Prolonged distal pudendal terminal motor nerve latency (PNTML) is a non-specific finding, reflecting demyelination and slowing of conduction in the nerve bundle, which is not necessarily indicative of denervation within the external anal sphincter (EAS) or puborectalis (PR) muscles. While needle EMG has been employed and provides more objective analysis of neuromuscular function it has been criticised because of its lack of objectivity, interpretation of findings being based on 'eyeballing' the motor unit pattern. Quantitative and qualitative electromyographic analysis allows for both objective and detailed analysis of neuromuscular function. Recent studies have published normative data for both the EAS and PR muscles and others have described the application of this technique in the evaluation of women with pelvic floor dysfunction and incontinence (1-3). The aim of this study was to compare PNTML values and electromyographic analysis of the EAS and PR muscles in women with symptomatic vaginal prolapse with or without faecal incontinence and to correlate these findings to pelvic floor endosonography.

Methods

Thirteen women with recurrent vaginal prolapse +/- concomitant faecal incontinence were recruited. A standard clinical proforma was completed evaluating symptoms of prolapse and faecal or urinary incontinence. Faecal symptoms were scored (0-20) and vaginal prolapse graded using the Baden-Walker classification system. Trans-anal ultrasound assessed integrity of the EAS and PR muscles. Distances from the anal verge to the distal border and middle of the PR were also assessed in the posterior midline, to allow accurate placement of the needle electrode at EMG. PNTML was assessed on both sides using a standard technique and considered prolonged if the shortest reproducible value was ≥ 2.6 milliseconds. Concentric needle EMG analysis of the motor unit potentials (MUP) analysis was then performed on both sides for the EAS and in the midline for the PR. Parameters assessed included amplitude, duration, number of phases and turns, and the size index. Interference pattern (IP) analysis assessed the number of turns/second, amplitude/turn and % activity. EMG findings were summarised as 0 = normal or 1-3 corresponding to mild, moderate or severe denervation.

Results

Mean age was 46 years (R20-72). Ten (77%) were parous (R1-4) - 5 had a previous normal and 5 an instrumental delivery. All 13 presented with prolapse symptoms - 8(62%) primary and 5(38%) recurrent. In the latter group all 5 women had undergone a previous vaginal repair, in 2 cases re-inforced with prolene mesh and the remaining by sacrospinous fixation. Nine (70%) reported faecal incontinence [mean score 6 (R4-12)] and 11 (85%) defecatory dysfunction. Three (23%) had stress and 9(69%) urge urinary incontinence. On examination 11(%) had a cystocele, 13(%) rectocele and 11(%) vault prolapse (all > grade 1). EAS defects were identified in 3(23%) women at ultrasound. In contrast there were no defects in the PR muscle. The findings at electrophysiology testing (PNTML / EMG) and correlation with ultrasound findings and type of prolapse are listed in Table 1.

Conclusions

Qualitative and quantitative electromyographic analysis demonstrate changes in both the puborectalis and external anal sphincter muscles in women with symptomatic vaginal prolapse. There was a greater pick-up of EMG abnormalities on computerised MUP analysis compared to subjective 'eyeballing'. There was poor correlation between prolonged PNTML values and abnormal EMG findings. EMG changes were more severe in women with recurrent versus primary prolapse. The clinical relevance of these findings however is unclear.

They may represent a risk factor for surgical failure or be a consequence of prolapse surgery.

Table 1

n	AG	PROLAP	FAEC	EAS	PNT	PNT	EM	MU	EM	MU
	E	SE	AI	DEFE	MI	MI	G	A	G	A
1	72	P	0	N	2.4	2.0	Y	Y	Y	Y
2	42	P	12	Y	1.8	2.0	N	Y	N	Y
3	32	P	6	N	1.8	2.0	Y	Y	N	Y
4	50	R	8	N	2.0	2.0	Y	Y	Y	Y
5	48	R	4	N	2.6	2.4	N	Y	N	Y
6	34	P	6	Y	2.4	2.6	Y	Y	Y	Y
7	71	R	6	Y	2.0	2.0	Y	Y	Y	Y
8	35	P	4	N	1.8	3.5	N	Y	N	Y
9	46	P	0	N	4.0	3.3	N	Y	N	Y
1	20	P	0	N	1.8	1.8	N	N	N	N
0										
1	64	R	8	N	2.2	2.7	Y	Y	Y	Y
1										
1	62	R	4	N	1.8	2.7	Y	Y	Y	Y
2										
1	26	P	0	N	2.7	2.3	N	N	N	N
3										

**Prolapse (P =Primary, R =Recurrent), Faecal score (R 0- 20), Other fields (Y=Yes, N=No)
MUA = computerised motor unit analysis.**

References

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3. Podnar S, Vodusek DB. Standardisation of anal sphincter EMG: high and low threshold motor units. Clin Neurophysiol 1999;110:1488-91.