

FEMALE LEVATOR ANI MUSCLE DEFECT ASSESSMENT IN SUPINE AND UPRIGHT POSITION

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1. Introduction

Pelvic floor disorders are linked to levator ani muscle (LAM) trauma in the iliococcygeus (ICM) and puborectalis (PRM) muscles)[1–4]. Magnetic Resonance Imaging (MRI), in supine, is used to assesses muscle trauma, though studies show position affects LAM shape and defects [5–7].

2. Objectives

We aim to develop an ICM injury scoring system and to determine differences in PRM and ICM injury in prolapse patients in supine and upright position.

3. Methods

64 patients with ≥stage 2 prolapse were scanned in 0.25T tiltable MR scanner in supine and upright position. PRM and ICM damage were scored bilaterally in 0-3 scale, with 0 being intact and 3 severe damage. Damage was classified with total score from both sides: none (0), minor (1–3), or major (4–6 or 3 on one side). For PRM, previously established protocol was used [8]. For ICM, a protocol for damage assessment was established, with score of 3 for herniation (>1cm). We used sign-test to compare grading between positions.

4. Results

The ICM assessment protocol achieved ICC values of 0.68 (0.57–0.77) in supine and 0.81(0.74–0.86) in upright position. Significantly more major ICM damage (p<0.001) was found in upright (51.6%) as compared to supine (6.3%) position. There was an underestimation of ICM damage in 59% of the supine position assessments. PRM damage scoring was unfeasible on upright MRIs.

5. Conclusion

Significant underassessment of trauma to the ICM is found in prolapse patients, when their anatomy was assessed in supine position.

6. References

[1] DeLancey JOL, Morgan DM, Fenner DE, Kearney R, Guire K, Miller JM, et al. Comparison of levator ani muscle defects and function in women with and without pelvic organ prolapse. Obstetrics and Gynecology 2007;109:295–302.

https://doi.org/10.1097/01.AOG.0000250901.57095.BA.

[2] Gearhart SL, Pannu HK, Cundiff GW, Buller JL, Bluemke DA, Kaufman HS. Perineal descent and levator ani hernia: a dynamic magnetic resonance imaging study. Dis Colon Rectum 2004;47:1298–304. https://doi.org/10.1007/S10350-004-0585-0.

[3] Pannu HK, Genadry R, Gearhart S, Kaufman HS, Cundiff GW, Fishman EK. Focal levator ani eventrations: Detection and characterization by magnetic resonance in patients with pelvic floor dysfunction. Int Urogynecol J 2003;14:89–93. https://doi.org/10.1007/S00192-003-1037-4/FIGURES/5.

[4] Kaufman HS, Buller JL, Thompson JR, Pannu HK, Demeester SL, Genadry RR, et al. Dynamic pelvic magnetic resonance imaging and cystocolpoproctography alter surgical management of pelvic floor disorders. Dis Colon Rectum 2001;44:1575–83. https://doi.org/10.1007/bf02234374.

[5] Grob ATM, olde Heuvel J, Futterer JJ, Massop D, Veenstra van Nieuwenhoven AL, Simonis FFJ, et al. Underestimation of pelvic organ prolapse in the supine straining position, based on magnetic resonance imaging findings. Int Urogynecol J 2019;30:1939–44. https://doi.org/10.1007/S00192-018-03862-0.



[6] Van Der Steen A, Jochem KY, Consten ECJ, Frank ·, Simonis FJ, Anique ·, et al. POP-Q Versus Upright MRI Distance Measurements: A Prospective Study in Patients with POP. Int Urogynecol J 123AD. https://doi.org/10.1007/s00192-024-05802-7.

[7] Abdulaziz M, Kavanagh A, Stothers L, Macnab AJ. Relevance of open magnetic resonance imaging position (sitting and standing) to quantify pelvic organ prolapse in women. Canadian Urological Association Journal 2018;12:E453. https://doi.org/10.5489/CUAJ.5186.
[8] Kearney R, Miller JM, Ashton-Miller JA, DeLancey JOL. Obstetric Factors Associated With Levator Ani Muscle Injury After Vaginal Birth. Obstetrics & Gynecology 2006;107.