

## The Impact of Laparoscopic Transversus Abdominis Release on the Intra-Abdominal Pressure in Patients with Large Anterior Wall Defects

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### Abstract

**Introduction:** The objective of this study was to collect and analyze data on patient demographics, lifestyle, abdominal cavity characteristics, and their impact on intra-abdominal pressure before and after minimally invasive treatment of large parietal defects in hernia pathology. Additionally, the study examines the role of the CT scan as a reliable and valid measure of defect and muscle characteristics, which can help establish the indication for performing Transversus Abdominis Release (TAR) and evaluate the outcomes of this procedure along with differences in intra-abdominal pressure (IAP) and plateau pressure (Pplat).

**Methods:** This prospective study involved 20 patients with parietal defects wider than 10 cm, treated over four years at the Central Military Hospital in Bucharest. All procedures were performed using the laparoscopic TAR technique by the same surgical team. Preoperative assessments included CT imaging to measure defect size, volumes, and IAP. Data including defect dimensions, muscle measurements, IAP, and Pplat were systematically recorded in a dedicated database with a follow-up at 6 months with clinical and imaging evaluations.

**Results:** In our cohort of 20 patients, all female, the mean BMI was  $26.81 \pm 3.05$ , and the hernia sac volume (HSV) averaged  $159.01 \pm 189.79 \text{ cm}^3$ . The defect area was  $69.53 \text{ cm}^2 (\pm 30.11)$ . IAP decreased from  $5 \text{ cmH}_2\text{O} (\pm 1.28)$  preoperatively to  $1.91 \text{ cmH}_2\text{O} (\pm 1.93)$  postoperatively. The reduction in Pplat was similarly significant. Pressure variations were influenced by the topographic location of the defect, with higher pressures seen in epigastric defects, and by the characteristics of the peritoneo-fascial defects, including number, size, and localization, which affect pressure outcomes. Additionally, dimensions of the anterior-lateral abdominal muscles correlated with pressure changes. These findings highlight the importance of comprehensive preoperative assessment of defect characteristics, muscular anatomy, and defect location for predicting pressure reductions and guiding surgical planning.

**Conclusions:** Higher BMI and large, multiple parietal defects predict increased IAP and Pplat postoperatively. Preoperative volumetric and morphometric parameters, defect localization, and topographic characteristics significantly influence pressure outcomes. The TAR technique effectively manages large defects while minimizing pressure increases, but consideration of morphological factors is crucial for optimal results. Further research is needed to refine patient selection and surgical strategies.

**Keywords:** intra-abdominal pressure (IAP), Plateau pressures (Pplat), transversus abdominis release (TAR), large parietal defects, minimally invasive treatment