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Abstract

**CLINICAL AND BIOLOGICAL STUDY RELATED WITH INTRAABDOMINAL
PRESSURE VARIATIONS DURING ANTERIOR-LATERAL ABDOMINAL WALL
POSTOPERATIVE DEFECTS RECONSTRUCTION PROCEDURES**

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Introduction

Incisional hernias are an important field of surgical pathology. Their incidence continues to be high, despite the progress achieved by the use of synthetic materials in abdominal wall plasty.

The main objectives of this paper are to evaluate the sensitivity of the indirect method of determining the intra-abdominal pressure by transvesical approach, the importance/ influence of the degree of myorelaxation on intra-abdominal pressure and the assessment of the tension-free principle by determining intraoperatively intra-abdominal pressure.

The general part is divided into three main sections which assess the main anatomical landmarks of the abdominal wall and the current state of knowledge regarding the pathophysiology of postincisional hernias and abdominal pressure by reviewing the most recent articles from surgical literature.

The special part includes the detailed description of the practical trials which were conducted over two years, 2011 and 2012, in the Surgical Clinic no.2 of the Tg. Mureș County Emergency Hospital.

To achieve the specific objectives, the special part is presented as three studies with different groups of patients.

Study I: Comparative study of intra-abdominal pressure recorded directly versus indirectly by transvesical approach.

The aim of the study is to verify the statistical correlation between the two methods of determining the intra-abdominal pressure and to establish the need of a possible correction factor for indirect measurements using the direct method as high sensitivity witness.

Method: A prospective longitudinal study including a group of 12 patients that underwent laparoscopic cholecystectomies for chronic cholelithiasis in the Surgical Clinic No.2 in January 2011. The intra-abdominal pressure was monitored in 24 different stages both directly by the CO₂ insufflation system and indirectly through the Abviser kit specifically designed for transvesical monitoring of IAP.

Results: The data obtained using the invasive and noninvasive recording procedures were compared for each moment. During the increase of intraabdominal pressure up to 12 mmHg, the recorded values revealed statistically significant differences, but during the maintaining of the pneumoperitoneum at 12 mmHg throughout laparoscopic surgeries, the differences between the two methods were statistically insignificant.

Study II: Changes in intra-abdominal pressure dependent on the degree of myorelaxation

The aim of the study was to test IAP variations that correspond to different degrees of myorelaxation induced by the neuromuscular blocking agents commonly

used in general anesthesia. Myorelaxation was evaluated using TOF (train of four) ratio by recording the muscle response to the electrical stimulation of peripheral nerves during extraabdominal surgeries.

Materials and method: The study group consisted of 9 patients who underwent extraabdominal surgeries: two total thyroidectomies, three subtotal thyroidectomies, three Madden simple mastectomies and one axilofemoral bypass.

Results: By comparing the results obtained in the nine cases we observed a statistically insignificant increase of intra-abdominal pressure with TOF values of 0, 1 or 2, but the intra-abdominal pressure showed significant variations with TOF values of 3 or 4 observed especially at the reversal of anesthesia and the patient's awakening.

Study III: Measurement of intra-abdominal pressure by transvesical approach during reconstruction procedures of anterolateral abdominal wall defects. Clinical and biological study.

The purpose of this study is to perform a series of correlations between various clinical and laboratory parameters and the intra-abdominal pressure recorded perioperative by transvesical approach in patients undergoing various types of abdominal wall repair for anterolateral incisional hernias.

Materials and methods. The prospective longitudinal study on intra-abdominal pressure variations during various procedures of abdominal wall reconstruction took place during 2011, from January 5 to December 15, and it included a total of 103 patients. The following parameters were evaluated: demographics, anatomical location of the hernia, type of abdominal wall repair, preoperative and postoperative dyspnea, postoperative pain, resumption of bowel movements, duration of hospitalization and intraoperative variations of intra-abdominal pressure.

Results: After the statistical analysis of the results a correlation between variations in abdominal pressure and types of parietal defects repair procedures was found. Tension free reconstruction was associated with minimal progression of dyspnea, low pain, rapid resumption of intestinal movements, reduced time of hospitalization and minor postoperative complications.

Conclusions:

1. The measurement of intra-abdominal pressure by direct and indirect methods showed no statistically significant differences except in rapid changes of IAP.
2. At TOF ratio values of 0, 1 or 2, the changes of intra-abdominal pressure were statistically insignificant but TOF values of 3 or 4 led to sharp increases of intra-abdominal pressure, observed especially on awakening/anesthesia reversal.
3. The indirect measurement of intra-abdominal pressure by transvesical approach was able to assess the degree of the abdominal wall plasty tension (evaluation of the tension free principle)
4. Increased intra-abdominal pressure caused by tension in the sutured tissues is correlated with a high level of postoperative pain.
5. The tension free principle was associated with low postoperative progression of dyspnea
6. Local complications were more frequent after the onlay procedure compared to the retromuscular position, due to the superficial position of the mesh.

Keywords: incisional hernia, intra-abdominal pressure, tension free, onlay.