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Comparative Analysis of the Effectiveness of Z-Fixation in Laparoscopic Peritoneal Biopsy

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Introduction:

Modern requirements for diagnostic procedures in abdominal surgery dictate the need to develop methods that combine minimal invasiveness with maximum diagnostic value. Traditional laparoscopic peritoneal biopsy, despite its widespread use, demonstrates a number of significant limitations associated mainly with the insufficient volume of material obtained and the risk of intraoperative complications.

Research objective:

Conducting a prospective comparative analysis of the effectiveness of a new biopsy method with Z-fixation compared to the traditional technique.

Materials and methods:

The study included 114 patients randomized into 2 groups:

1. The main group (n=57) - biopsy with Z-fixation
2. The control group (n=57) - standard biopsy

Evaluation criteria:

- Volume of the obtained biopsy
- Preservation of the histological structure
- Frequency of intraoperative complications
- Time of the procedure
- Diagnostic efficiency

Results:

1. Quantitative indicators:

- Average sample volume: $36.2 \pm 2.1 \text{ mm}^2$ (Z-fixation) vs. $17.4 \pm 3.8 \text{ mm}^2$ (control)
- Time of execution: $8.2 \pm 1.1 \text{ min}$ vs. $5.4 \pm 0.9 \text{ min}$

2. Qualitative indicators:

- Preservation of the mesothelium: 100% vs. 57%
- Bleeding rate: 0% vs. 8%

3. Diagnostic efficiency:

- Material sufficiency: 98% vs. 83%
- Need for repeat biopsy: 0% vs. 15%

Discussion:

The results demonstrate a significant advantage of the Z-fixation method in all key parameters, except for time costs. The increase in procedure time by 2.8 minutes is compensated by the absence of the need for repeated interventions and high diagnostic value.

Conclusions:

1. The Z-fixation method provides a statistically significant increase in the volume of biopsy ($p < 0.01$)
2. Guarantees the preservation of the histological structure in 100% of cases
3. Allows to avoid intraoperative complications
4. Recommended as a method of choice when it is necessary to obtain high-quality biopsy material