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EVALUATION OF LAPAROSCOPY AS A TREATMENT METHOD FOR ABDOMINAL TRAUMA

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Abstract: This study evaluates the effectiveness of laparoscopy in the diagnosis and treatment of closed abdominal trauma (CAT) among hemodynamically stable patients. A total of 320 patients were retrospectively analyzed, comparing outcomes between traditional laparotomy and diagnostic laparoscopy. The research emphasizes the importance of selecting appropriate candidates based on ultrasound assessment of intra-abdominal fluid volume. Results show that laparoscopic interventions, when guided by a structured algorithm, reduce unnecessary laparotomies, lower complication rates, and shorten hospital stays. These findings support expanding indications for laparoscopy in abdominal trauma management, especially for patients with less than 500 ml of free intra-abdominal fluid.
Keywords: laparoscopy, abdominal trauma, diagnostic surgery, hemodynamic stability, minimally invasive techniques.

Introduction

Laparoscopy has emerged as a viable alternative to laparotomy for the management of abdominal trauma, offering several advantages in terms of perioperative outcomes and patient recovery. Studies have consistently shown that laparoscopy can significantly reduce the incidence of postoperative complications, such as wound infections and pneumonia, compared to laparotomy, while also decreasing the length of hospital stay and operation time(Li et al., 2015) (Wang et al., 2022). The technique is particularly beneficial in hemodynamically stable patients, where it can be used both diagnostically and therapeutically to avoid unnecessary laparotomies, thereby reducing the rate of nontherapeutic interventions and associated complications(AlZarouni et al., 2022) (Asaad et al., 2012). Laparoscopy has been shown to effectively manage both penetrating and blunt abdominal trauma, with a high success rate in therapeutic interventions and a low conversion rate to open surgery(Ala et al., 2019) (Pau et al., 2021). The procedure also allows for a thorough evaluation of intra-abdominal injuries, minimizing the risk of missed injuries(AlZarouni et al., 2022) (Magalhães et al., 2019). However, the success of laparoscopic interventions heavily depends on the surgeon's expertise and the availability of advanced medical facilities(Wang et al., 2022) (Aprialdi et al., 2024). Despite these advantages, there remains no significant difference in mortality rates between laparoscopy and laparotomy, suggesting that while laparoscopy improves recovery metrics, it does not necessarily impact survival outcomes(Wang et al., 2022). Overall, laparoscopy is a safe and effective method for managing abdominal trauma, offering improved recovery times and reduced complications, but requires skilled surgical teams and appropriate resources to maximize its benefits(Mohamed et al., 2024) (Tao, 2006).

Relevance. Modern abdominal injuries in humans often involve multiple and combined damages, leading to high mortality rates of up to 58%. One of the main challenges in treating these patients is the complexity of diagnosis, as injuries affect various body regions and the clinical presentation is often unclear. Diagnostic errors occur in 73.1% of cases. Consequently, performing exploratory laparotomy in the early stages to prevent complications such as peritonitis or intra-abdominal bleeding has become a common tactical approach. However, patients' conditions may deteriorate

after such operations, especially in cases of severe injuries. In some instances, the traumatic impact of laparotomy outweighs its potential benefits.

The aim of the study is to improve the outcomes of diagnosis and surgical treatment for patients with closed abdominal trauma (CAT) by expanding and specifying indications for laparoscopy, taking into account the volume of free fluid in the abdominal cavity.

Materials and Methods. For a retrospective analysis, 320 patients with closed abdominal trauma whose hemodynamics had stabilized by the time of surgery initiation were selected. The study included individuals aged 18 to 60 with stable blood pressure upon admission and stabilized hemodynamics after preliminary anti-shock therapy. Patients were divided into two groups depending on whether video laparoscopic techniques were used for diagnosis and treatment. 218 patients from the control group underwent extensive laparotomy without laparoscopy, while 102 patients from the main group underwent surgery using diagnostic laparoscopy.

Due to the fact that laparoscopic interventions were primarily attempted in patients with questionable clinical and sonographic signs of hemoperitoneum, including as a so-called "safety laparoscopy" in patients with combined abdominal trauma, this apparently resulted in a difference in the mean systolic blood pressure indicators (p=0.0029).

The frequency of intraoperative detection of severe intra-abdominal complications that unequivocally require open surgery with extensive interventions, such as suturing deep and extensive ruptures of parenchymal organs, hollow organ walls, organ resection or removal, was 43.8% (occurring in 70 patients). Interestingly, this indicator in the control group of patients, a significant portion of whom underwent wide laparotomy due to the presence of sonographic signs of free fluid in the abdominal cavity exceeding 500 ml (a contraindication for laparoscopy), was 62.4%.

One of the significant advantages of using laparoscopy in patients with closed abdominal trauma is the possibility of avoiding unnecessary laparotomy. In our observations of the primary wide laparotomy group (n=109), in 2 (1.8%) cases, no intraoperative abdominal injuries requiring surgical procedures were detected, which we assessed as "unnecessary laparotomy." We do not apply this term to diagnostic laparoscopy, as after 3 (5.9%) cases of exploratory endovideosurgery in patients with closed abdominal trauma, we did not observe any postoperative specific complications associated with this surgical procedure. In other words, the use of laparoscopy in these cases made it possible to reliably exclude intraperitoneal damage without any negative consequences for patients.

Results and discussion.

Given the identified relative safety of laparoscopy, we have somewhat broadened the indications for its use. This approach, while increasing the conversion rate to 37.3%, was not accompanied by iatrogenic intraoperative complications and did not significantly increase the average total intervention time (108.1±28.6 min for laparoscopy followed by conversion versus 103.0±48.7 min in the primary wide laparotomy group, p=0.657). However, in cases where all therapeutic and diagnostic procedures could be performed laparoscopically without resorting to conversion, the average duration of the intervention was 57.0±40.8 min.

The desire of some of our laparoscopic surgeons to expand the indications for laparoscopy even in patients with a free fluid volume in the abdominal cavity greater than 500 ml, especially in patients admitted late (more than a day after injury), provided they maintain stable hemodynamic parameters, was reflected in the "total blood loss" indicator. In the group of laparoscopic interventions without conversion (n=32), the average blood volume in the abdominal cavity was 837±681.3 ml, which significantly exceeds the 500 ml limit we established. However, at the current stage and level of laparoscopic technique mastery by most of our surgeons, we consider it

expedient to limit the indications for laparoscopy in patients with closed abdominal trauma to those with a free fluid volume in the abdominal cavity not exceeding 500 ml.

Another confirmation of the feasibility of such a limitation of indications for laparoscopy is, in our opinion, the average volume of hemoperitoneum detected in patients who required conversion of laparoscopic intervention, which amounted to 902.4±658.5 ml, approximately corresponding to the same indicator in the control group - 1141.7±676.1 ml ($p>0.05$). Moreover, adherence to our developed "algorithm for choosing surgical treatment tactics for closed abdominal trauma based on ultrasound assessment of free fluid volume in the abdominal cavity" when selecting patients for laparoscopy or primary laparotomy made it possible to minimize the frequency of unnecessary laparotomy (2 (1.8%) cases out of 109 laparotomies). This was achieved not only through the widespread use of diagnostic laparoscopy but also due to the prognostic effectiveness of our chosen "< or > 500 ml" criterion.

The diagnostic effectiveness of our developed scale for calculating the volume of free fluid in the abdominal cavity using ultrasound, which allowed predicting the presence of a milder or more severe intra-abdominal injury in patients with closed abdominal trauma before surgery, was indirectly confirmed by the number of cases requiring blood transfusion. Thus, with a free fluid volume in the abdominal cavity up to 500 ml, we predicted a milder injury to the internal organs and opted for primary laparoscopy. In this group of patients (n=51), the frequency of blood transfusion totaled 10 (19.6%) cases (3 cases in the "Laparoscopy" subgroup and 7 cases in the "Laparoscopy+Conversion" subgroup), while in the control group of patients who underwent primary laparotomy (n=109), packed red blood cell transfusion was required in 51 (46.8%) patients.

Conclusions.

In 62.8% of patients with closed abdominal trauma, injuries are detected intraoperatively, which, due to their nature and severity, can potentially be addressed laparoscopically using routinely applied endosurgical instruments without particular technical difficulties. This justifies the expediency of expanding the indications for laparoscopy in abdominal injuries.

The average duration of laparoscopic procedures for closed abdominal trauma in patients with stable hemodynamics is 57.0±40.8 min. Laparoscopy with subsequent conversion to open surgery does not significantly increase the average duration of the intervention compared to primary wide laparotomy (108.1±28.6 versus 103.0±48.7 min, $p=0.657$). The selection of patients for laparoscopic interventions using the proposed algorithm, along with the minimally invasive nature of this surgical approach, contributes to a significant reduction in ICU stay from 2.8±1.1 to 1.8±1.0 days, inpatient treatment duration from 8.7±3.4 to 5.3±2.9 days, and a notable decrease in the frequency of postoperative complications from 11.9 to 3.1% ($p=0.144$).

References:

1. Ala, W., Mustafa, E., Rawad, F., & Abdulaziz, B. (2019). Role of Laparoscopy in Abdominal Trauma. https://doi.org/10.23937/2378-3397/1410100
2. Alpersovna, M. Y., & Erkinjon o‘g‘li, L. A. (2025). ALKOGOLLI PANKREATIT: SABABLARI, BELGILARI VA DAVOLASH USULLARI. *ZAMONAVIY TA'LIMDA FAN VA INNOVATSION TADQIQOTLAR JURNALI*, *3*(2), 17-22.
3. AlZarouni, N., Salem, A., Nurelhuda, N., Osman, R. A. G. S., & Eltayyeb, Y. (2022). Role of laparoscopy in patients with abdominal trauma: Rashid Hospital Trauma Center experience. Journal of Emergency Medicine, Trauma and Acute Care. https://doi.org/10.5339/jemtac.2022.30
4. Aprialdi, B., Alauddinsyah, T. S., Alfina, F. T., & Dhati, M. R. A. (2024). The systematic review of laparoscopic surgery for trauma. Journal of Advanced Research in Medical and Health Science. https://doi.org/10.61841/a9jc3191

5. Asaad, M., Al-Dabbagh, K. A., Ali, M. S., Attash, S. M., & Al-Khyatt, M. K. (2012). The application of laparoscopy in abdominal trauma at Al-Jumhoori Teaching Hospital in Mosul. https://doi.org/10.33899/MMED.2012.64399
6. Karabaev Jasurbek Mavlyanjanovich. (2025). CURRENT CHALLENGES AND ADVANCES IN PEDIATRIC TRAUMATOLOGY. *International Multidisciplinary Journal for Research & Development*, *12*(05), 157–160. Retrieved from https://www.ijmrd.in/index.php/imjrd/article/view/3051
7. Li, Y., Xiang, Y., Wu, N., Wu, L., Yu, Z., Zhang, M., Wang, M., Jiang, J., & Li, Y. (2015). A Comparison of Laparoscopy and Laparotomy for the Management of Abdominal Trauma: A Systematic Review and Meta-analysis. World Journal of Surgery. https://doi.org/10.1007/S00268-015-3212-4
8. Magalhães, B. F., Leite, P. de S., Filho, P. H. B. M., Sá, G. W. S. de, Mascarenhas, W. P., Maia, L. B., Lima, T. P. de O., Marques, I. de M., & Rolim, F. F. de A. (2019). Laparoscopy and Penetrating Abdominal Trauma: A Systematic Review. https://doi.org/10.14295/AIMJ.V4I7.92
9. Meliboev, R. A., & Eminov, R. I. (2025). EXPLORING METHODS TO IMPROVE THE TREATMENT OF COMPLICATIONS ARISING FROM ENDOUROLOGICAL OPERATIONS FOR URINARY STONE DISEASE (LITERATURE REVIEW). *mortality*, *4*, 13.
10. Mohamed, A. M. M., Kabbash, M. M., Al-Bokhary, A. A. E. A., & Rayan, Y. M. (2024). Laparoscopy versus laparotomy in the management of abdominal trauma. Surgical Practice. https://doi.org/10.1111/1744-1633.12679
11. Pau, L., Navez, J., Cawich, S. O., & Dapri, G. (2021). Laparoscopic Management of Blunt and Penetrating Abdominal Trauma: A Single-Center Experience and Review of the Literature. Journal of Laparoendoscopic & Advanced Surgical Techniques. https://doi.org/10.1089/LAP.2020.0552
12. Qoraboyev Jasurbek Mavlonjon O‘G‘Li, & Raximova Ruxshona Shavkat Qizi (2024). KATTALARDAGI OG‘IR MIYA SHIKASTLANISHI. Eurasian Journal of Medical and Natural Sciences, 4 (2), 156-162. doi: 10.5281/zenodo.10776140
13. Ravshan o'g'li, K. S., & Mavlonjon o’g’li, Q. J. (2024). Review Of The Use Of Tomosynthesis For The Diagnosis Of Injuries And Diseases Of The Musculoskeletal System. *Frontiers in Health Informatics*, *13*(6).
14. Tao, H. (2006). The application of laparoscopy in abdominal trauma. Journal of Laparoscopic Surgery.
15. Wang, J., Cheng, L., Liu, J., Zhang, B., Wang, W., Zhu, W., Guo, Y.-M., Bao, C., Hu, Y. N., Qi, S., Wang, K., & Zhao, S. (2022). Laparoscopy vs. Laparotomy for the Management of Abdominal Trauma: A Systematic Review and Meta-Analysis. Frontiers in Surgery. https://doi.org/10.3389/fsurg.2022.817134