

COMPUTER PROGRAM FOR SELECTING TACTICS FOR TREATMENT OF CLOSED INJURIES TO HOLLOW ORGANS IN ABDOMINAL INJURIES

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ABSTRACT

In this article, the authors have developed and proposed a computer program for selecting tactics for the treatment of closed injuries of hollow organs in abdominal injuries, which is simple and accessible for use in practical abdominal surgery. This circumstance makes it possible to use it at all levels of the emergency medical care system, including branches and sub-branches of the Republican Scientific Center for Emergency Medicine, as well as to carry out computer monitoring of the condition of patients in the dynamics of the treatment process. The widespread use of a computer program in patients with closed injuries of hollow organs due to abdominal trauma allows optimizing the diagnostic and treatment process and significantly improving treatment results.

Keywords: Computer program, closed injuries, abdominal surgery.

INTRODUCTION

Relevance of the problem. One of the pressing issues of modern emergency abdominal surgery that requires resolution is the problem of tactics for treating closed injuries of hollow organs (STIs) for abdominal injuries, accompanied by high mortality from 27% to 35% [Malkov I.S. et al., 2016; Lebedev A.G. et al., 2019; Lechler P. et al., 2014; Kanlerd A. et al., 2022].

Unfortunately, despite the numerous publications available to date, questions of surgical tactics, sequence and scope of interventions in patients with STDs with isolated or combined abdominal injuries remain completely unresolved [Govorov M.V. et al., 2017; Coleman JJ et al., 2017].

Originally proposed concept of immediate total care (ETC) tactics consisting in performing the full scope of multidisciplinary specialized surgical care for victims in the first 6 hours after injury turned out to be, firstly, fraught with the risk of developing various complications from vital organs and systems, and secondly, it limited the scope of surgical care in severe and extremely severe borderline conditions of patients, due to severe hemodynamic disturbances [Khubutia M.Sh. et al., 2015; Shapkin Yu.G., Seliverstov P.A., 2016; Kleanthis A. et al., 2017].

In this regard, a tactic of staged treatment of injuries with combined closed abdominal injuries and their control (damage control surgery - DCS) was subsequently proposed, which included dividing the treatment process into 3 stages, i.e. applications of programmed relaparotomy (PRLT). The attractiveness of damage control tactics in modern conditions is that it creates the possibility of widespread use of minimally invasive endovisual technologies in the form of VLS and VALS with minilaparotomy for the correction of STDs in isolated and combined abdominal injuries [Pankratov A.A., 2018; Poznansky S.V., Gagua A.K., 2018; Khadzhibaev A.M. et al., 2022; Koganti D. et al., 2021].

At the same time, it must be stated that to date remain undeveloped objective criteria for justifying feasibility application of various tactical concepts for the correction of existing STDs in patients with combined abdominal injuries in specific clinical situations.

In this regard, the purpose of this study was to improve the results of STD correction for abdominal injuries by development of a computer program for selecting treatment tactics for injuries.

MATERIAL AND RESEARCH METHODS

To create a computer program for choosing treatment tactics for patients with STDs with abdominal trauma, the obtained gradations for predicting the likelihood of a severe course of STDs according to the developed integral scale (Table 1), we supplemented with treatment data regarding the volume of various therapeutic manipulations to correct existing intraperitoneal injuries of hollow organs and possible combined extraperitoneal injuries.

Table 1. Gradations of prognosis of the probability of severe STD in abdominal injuries

Probabilities of severe STD	Sum of prognostic coefficients (PC)
Low probability	from 3.38 to 5.17
Average probability	from 5.18 to 10.35
Great chance	from 10.36 to 15.52

These treatment data included open traditional surgical interventions (LT, TT, craniotomy, open osteosynthesis, etc.) and modern minimally invasive technologies (VLS, VALS with mini-laparotomy, VTS, VATS with mini-thoracotomy, PAM, application of extended burrs holes in the skull, the use of external fixators, etc.).

The results obtained and their discussion

This entire diverse therapeutic arsenal, in independent or combined versions, in the computer program being developed should have received its place and appropriate sound, depending on the data predicting the likelihood of a severe course of STDs determined by the integral scale. When performing this rather complex task, the computer program we created, in addition to the very probability of a severe course, was guided by a specific sum of prognostic coefficients scored by the integral scale in each clinical situation. In our opinion, only the application of this principle, with the help of a computer program, creates the opportunity to cover and display the entire diverse range of treatment options for patients with STDs.

The next stage of our research was the cybernetic interpretation and processing of the results obtained, which was expressed in the form of the creation of a computer program for choosing treatment tactics for patients with STDs with abdominal injuries).

A distinctive feature of the computer program we created was that it significantly simplifies the entire procedure for the practitioner, who is only required to enter the required initial parameters. Next, the program automatically calculates the sum of the accumulated prognostic coefficients, indicating the probability of severe STD and the recommended type and volume of necessary medical manipulations for patients with closed abdominal injuries in a specific clinical situation.

It should be noted that the computer program for selecting treatment tactics for patients with STDs with abdominal injuries is quite simple to use and accessible to any practitioner. This, firstly, makes it possible to use it at all levels of the emergency medical care system, including branches and sub-branches of the Republican Scientific Center for Emergency Medicine, and secondly, to carry out computer monitoring of the condition of patients in the dynamics of the treatment process.

Thus, summing up all of the above, it should be noted that the computer program we have developed for selecting treatment tactics for patients with STDs with abdominal injuries most fully meets all the requirements of practical emergency medicine.

The program consists of 2 diagnostic and 1 tactical stages:

1. Clinical diagnostic stage. At this stage, data from general clinical and laboratory and instrumental studies is collected. It should be noted that in patients with unstable hemodynamics, the examination is carried out against the background of anti-shock measures and intensive conservative therapy.
2. The stage of entering data into a computer program. At the same time, the collected clinical, laboratory and instrumental parameters of patients are entered into a computer program by practitioners accordingly.
3. Tactical stage. Based on the above data, a computer program automatically calculates and decides on the option of therapeutic manipulations (volume and nature of conservative therapy, timing and specific nature of surgical interventions, etc.) for patients with STDs due to abdominal injuries.

We received patent No. DGU 32518 from the Patent Office of the Republic of Uzbekistan dated January 11, 2024 for this computer program.

Thanks to the calculations carried out using the proposed computer program in a rather complex clinical situation, the patient was able to select and implement adequate treatment tactics for combined abdominal trauma.

CONCLUSION

Thus, based on the results of the study, we can conclude that the computer program we developed and proposed allows us to conduct a thorough and comprehensive assessment of the general condition of patients and predict the likelihood of severe recurrents STDs in abdominal injuries and, based on this, choose the correct treatment tactics for intraperitoneal and extraperitoneal injuries.

The widespread use of a computer program in patients with STDs and abdominal injuries allows us to justify the use of tacticsearly total care – ETC in patients with severe condition and unstable hemodynamics, and also creates the opportunity to divide the surgical interventions performed into several stages by transferring them to the category of minimally invasive and urgently delayed, according to tacticsdamage control surgery – DCS.

This circumstance undoubtedly optimizes the diagnostic and treatment process and significantly improves the results of treatment of urgent patients with STDs and abdominal injuries.

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