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**IMPLEMENTAREA METODELOR LAPAROSCOPICE ÎN
ASIGURAREA CALITĂȚII SERVICIULUI CHIRURGICAL DE
URGENTĂ**

**„IMPLEMENTATION OF LAPAROSCOPIC METHODS IN THE
QUALITY ASSURANCE OF THE EMERGENCY SURGICAL
SERVICE”**

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List of abbreviations

AA	acute abdomen
AIT	Anesthesia intensive therapy
ASA	The American Society of Anesthesiologists
BAU	Business as Usual, the "no project" scenario
CE	cost-effectiveness
CEA	cost-effectiveness analysis
CER	Cost-effectiveness ratio
CBA	cost-benefit analysis
CUA	cost-utility analysis
CDEM	Clinical Department of Emergency Medicine
DEM	Department of Emergency Medicine
DPC	dynamic premium cost
DRG	software application, Diagnosis -related group
DUC	dynamic unit cost
EC	efficiency-cost ratio
ECG	Electrocardiogram
ESR	Erythrocyte sedimentation rate
FAST	Focused Assessment with Sonography for Trauma
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM)
IEM	Institute of Emergency Medicine
L0	control group
L1	research group
LS	laparoscopy
LCE	laparoscopic cholecystectomy
LT	laparotomy
MS	Ministry of Health
MSPS	Ministry of Health and Social Protection
NCP	National Clinical Protocol
NMIC	National Medical Insurance Company
PHMI	Public Health Medical Institution
SWOT	Strengths, Weaknesses, Opportunities, Threats, meaning „Strengths, Weaknesses, Opportunities, Threats”
TCE	traditional cholecystectomy
UC	unit costs
UDE	upper digestive endoscopy
USA	United States of America
USG	ultrasonography
VATcost	current value of total costs
WHO	World Health Organization
€	the currency sign used for the euro currency, the official currency of the European Union
\$	monetary unit of the United States

CONCEPTUAL MARKINGS OF THE RESEARCH

The emergency surgical service is a health service provided by a PHMI, which deals with the interventional treatment of patients who need immediate and urgent medical care for surgical conditions. This service covers a wide range of pathologies, including serious trauma and other surgical emergencies, including the acute abdomen (AA), which remains a frequent surgical emergency in the work of doctors, representing a spectrum of pathologies, which requires immediate evaluation in order to argue the tactics of treatment [1]. The prompt diagnosis of surgical AA is essential, ensuring the avoidance of unjustified delay in treatment that influences the patient's prognosis [11, 12, 15]. One of the basic paraclinical investigations is laparoscopy (LS) - an invasive exploration introduced into the current practice of urgent surgery, which ensured the reduction of unsubstantiated laparotomies (LT) [17]. Renz BM. and Feliciano DV., examining the morbidity after diagnostic laparotomy, demonstrated that 41.3% patients developed complications, and diagnostic laparoscopy in the acute abdomen presented a complication risk of 3.6% [31]. The causes of the fulminant development of laparoscopic surgery were: the advantages of laparoscopy determined by the improvement of the postoperative evolution, less pain in intensity and duration, early mobilization, early feeding, reduction of the hospitalization and recovery period, the aesthetic benefit, a lower rate of postoperative complications compared to traditional surgical techniques [2, 4]. These advantages facilitated the identification of the quality criteria provided to the patient, and the economic evaluation of the case treated with the application of the laparoscopic technique demonstrated that the cost-effectiveness of laparoscopy at the institutional level has an imposing economic impact [9,18].

Quality refers to the characteristics/properties of a product/service that give it superior value or make it fit for use for a particular purpose and meet the expectations/needs of the user/beneficiary. Service provision is an activity or a process performed by people, which is oriented towards satisfying the requirements of the beneficiaries (external or internal). Internal customers are those within the service provider's own organization [27]. The provision of a service in the health system may involve: an activity carried out on a material product provided by the beneficiary (for example, AA requiring diagnosis and treatment, acute cholecystitis requiring treatment); creating an ambience for the patient (for example, in PHMI hospital sector). The characteristics of the services provided in abdominal emergencies are specifically characterized by: the intangibility of many services: by their nature, many services are intangible, they cannot be tasted, felt or heard before being "consumed" (for example, surgical intervention, assistance medical); inseparability: overlap of the moment of production and consumption of the service; non-storability: services cannot be stored for later use; strong beneficiary-provider interaction: the patient to whom a service is provided is physically present when that personal service is performed, for example in the case of laparoscopy, laparotomy, taking biological samples, etc. In the medical services sector, direct observations of the performance of medical staff combined with indirect assessment through patient interviews can be used to assess quality. For hospitals, quality means very specific clinical data collected and analyzed over a period of time. Assessing the quality of the medical act is not always easy. According to

specialists in the quality of the medical act, a provider of medical services must ensure the following: safety by avoiding accidents in patient care; effectiveness - provision of medical services based on scientific evidence and best medical practice; patient centered care or care provision that respects and responds to their preferences, needs and values; providing care when needed means reducing wait times and delays that are sometimes harmful to both those receiving and those providing medical care; efficiency is explained by avoiding losses, such as equipment damage, improper use of consumables, energy; equity explained by the provision of care services that do not vary in quality due to personal characteristics such as gender, nationality, geographic location and socio-economic status. Quality measurement is based on data collected from medical records, invoices or administrative codes used to classify diagnoses and conditions [27]. The information is processed using complex mathematical models to make it understandable. Factors that affect quality are the number of patients receiving treatment in an PHMI and the severity of the disease, risky or difficult procedures [74].

According to the data of the specialized literature, in the public health system, the benefits are difficult to express monetarily, thus, the cost-effectiveness analysis (CEA) allows to argue the use of diagnostic and treatment methods that aim to ensure a higher level of quality through the implementation modern technologies [22]. The evaluation of the cost-effectiveness (CEA) of various treatment methods aimed at solving the same well-determined goal, represents an important objective of the organization of emergency medical care at the level of the hospital sector. The need to evaluate the cost-effectiveness of curative-diagnostic surgical interventions is determined by [13]:

- the progressive increase in the costs of medical services provided;
- the appearance of alternative methods of treatment of many pathologies;
- limited financial possibilities for equipping with highly specialized technologies;
- limited capacity to pay for medical services by the population in the conditions of the existing economic difficulties of the majority of the beneficiaries of the medical services provided.

Under these conditions, the need to evaluate existing treatment methods is argued both by assessing quality criteria and by economically analyzing similar clinical cases of AA treated with classic/laparoscopic surgery in order to identify the most effective treatment methods in order to improve the quality of medical services provided [13]. In the economic evaluation of surgical interventions, such types of analysis as cost-effectiveness analysis (CEA), cost-benefit analysis (CBA), cost-utility analysis (CUA) are useful. Cost-effectiveness analysis (CEA) is an economic tool for identifying and selecting an alternative solution to achieve the same objective, but which is not quantified in monetary units of measure, but in physical units of measure [13]. Cost-benefit analysis (CBA) reflects the relationship between effects, expressed as results, benefits and efforts (expenses) [66]. The cost-utility analysis (CUA) can be expressed by the quantitative criterion - the increase in life expectancy and the qualitative criterion - the quality of life [25, 27]. The advantage of CEA, which argues the quality of the medical act, compared to CBA, is less expensive, easier to achieve when social benefits and costs are difficult to monetize, and the expression of benefits

does not require valorization in monetary terms [27]. The comparative evaluation of quality criteria through the lens of cost-effectiveness analysis (CEA) of surgical interventions have been studied internationally and practically applied in the managerial system at different levels, including institutional ones. In the Republic of Moldova, no publications were identified in the specialized literature with reference to the evaluation of the quality criteria of surgical interventions in abdominal emergencies in tandem with the economic evaluation and the impact of these evaluations at the institutional level [21].

Based on the statistical report no. 30 - Health, annex no. 1, from 2019, it was found that in 2019, 8996 surgical interventions were performed to provide medical assistance in abdominal emergencies, of which only 848 were minimally invasive laparoscopic surgical interventions, constituting 9.43% [30]. According to the data of the „Informative Note on the medico-demographic situation in the Republic of Moldova in 2020 compared to 2019”, mortality due to emergency surgical illnesses at home was described by 110 reported cases, which represents an incidence of 3.1 per 100000 inhabitants, compared to year 2019, when 134 cases of deaths were registered, equivalent to 3.8 per 100000 inhabitants [23, 30].

In order to analyze the practical applicability of laparoscopic surgery in the emergency surgical service, a research was carried out, with the theme: „*Implementation of laparoscopic methods in ensuring the quality of the emergency surgical service*”.

The purpose of the research. Evaluation of similarly treated cases of acute abdomen based on clinical and economic analysis of diagnostic/curative laparoscopic methods to optimize the quality of treatment in abdominal emergencies.

Study objectives

1. Clinical evaluation of curative diagnostic laparoscopic methods in the emergency surgical service.
2. Assessment of the quality of acute abdomen treatment in the emergency surgical service.
3. Economic evaluation of curative diagnostic laparoscopic methods in the emergency surgical service.
4. Evaluation of the cost-effectiveness of minimally invasive and classic surgical interventions.
5. Elaboration of recommendations for optimizing the quality of acute abdomen treatment in the emergency surgical service.

Scientific research methodology. The analytical study conducted was a mixed one, of clinical and economic evaluation of two groups of patients with similar acute abdominal conditions that required traditional/laparoscopic surgical interventions within the IMSP IMU (Emergency Medicine Institute), surgery department. The primary material was accumulated based on the questionnaire developed by the author. The study was approved by the Research Ethics Committee of the State University of Medicine and Pharmacy "Nicolae Testemițanu" (minute no. 79 of June 19, 2018).

The novelty and scientific originality is appreciated by applying the economic evaluation of the cases treated for acute abdomen, comparing them and identifying the impact of the cost-effectiveness analysis in the multicriteria evaluation (clinical,

economic, social) of the surgical treatment method. This analysis allowed the identification of the most welcome treatment both for the beneficiary, who requires qualified medical care for acute abdomen, and at the institutional level.

The scientific problem solved in the thesis. The results of the research contributed to the solution of an important scientific problem by substantiating from a methodological point of view (clinical and economic analysis) the process of identifying the most effective methods of classical/laparoscopic surgical treatment of similar conditions of acute abdomen, a fact that confirmed the opportunity to optimize the management of abdominal emergencies by implementing laparoscopic methods in ensuring the quality of the emergency surgical service.

Theoretical significance. The comparative evaluation of the batches conditioned the identification of the criteria that argue the quality of medical care provided in similar states by AA within the emergency surgical service. The cost-effectiveness analysis (CEA), which is an economic evaluation method, was important as a tool for comparing laparoscopic and classic surgical interventions, when only one dimension matters, that of the results that evaluate the effectiveness of the quality indicators of the medical care provided in the emergency surgical service.

The applicative value of the work. The research results confirm the usefulness of the application of the tools to identify the quality criteria of classical/laparoscopic surgical treatment of similar acute abdominal conditions based on the clinical and economic evaluation of the treated cases, with a direct decision-making impact in optimizing the quality of treatment in abdominal emergencies.

Implementation of results. The results of the study were implemented in the IMSP IMU activity and 2 innovation implementation acts were obtained.

Approval of results. The results of this research were discussed and approved at the joint meeting of the members of the guidance committee, the collaborators of the "Nicolae Testemițanu" Department of Social Medicine and Management and the Department of Medical Emergencies within the IP USMF "Nicolae Testemițanu" (minutes no. 10 of April 10, 2023) and the profile scientific seminar 331. Public health, specialties 331.03 Social medicine and management; 331.04 Healthy way of life (minute no. 6 of June 5, 2023).

Publications on the topic of the thesis. 21 scientific papers were published on the topic of the thesis: 4 articles in accredited national journals, 2 articles in international scientific collections, 15 theses in the proceedings of national and international scientific conferences. 2 copyright certificates and 3 innovator certificates were obtained.

Summary of the thesis. The research results were presented on 109 pages of basic text: introduction, 4 chapters, general conclusions and recommendations, 35 tables and 64 figures. The bibliography includes 99 sources. The main results of the study were published in 21 scientific papers. In the introduction, the topicality of the scientific problem addressed in the thesis was described and the purpose, objectives, methodology of the research, the scientific novelty, the theoretical importance and the applied value of the work, the approval of the study results were reflected.

Chapter 1, "The theoretical framework of the implementation of laparoscopic methods in ensuring the quality of the emergency surgical service"

reflects the literature review, which was carried out by accessing the Scopus database and the Google-Scholar search engine, 99 bibliographic sources being analyzed.

Chapter 2 "Research methodology" refers to the general characteristics of the study, the research design, methods applied to achieve the stated objectives.

Chapter 3 "Evaluation of the quality of acute abdomen treatment methods in the emergency surgical service", reflects the results of the study, demonstrating the impact of the clinical evaluation of the patients included in the research for the assessment of quality criteria and their comparison, in order to identify the most optimal treatment tactics of similar AA statuses, both for the beneficiary and for the IMSP.

Chapter 4 "Optimization of the management of the emergency surgical service" is relevant in assessing the correlation between the economic evaluation and the quality criteria of the treatment of similar conditions of AA, the impact of this analysis in the optimization of the management of abdominal surgical emergencies.

In the **"General conclusions"** section statements are presented with reference to the findings resulting from the research carried out, followed by **recommendations** in order to promote the implementation of laparoscopic surgery in abdominal emergencies.

Key words: acute abdomen, analysis, surgery, cost, effectiveness, efficiency, intervention, laparoscopy, health, system.

THESIS CONTENT

The results of the research on the topic *"Implementation of laparoscopic methods in ensuring the quality of the emergency surgical service"*, were presented on 109 pages of basic text, consisting of an introduction, three chapters, conclusions and recommendations. The work contains 64 figures, 35 tables and 11 appendices.

1. THEORETICAL FRAMEWORK OF THE IMPLEMENTATION OF LAPAROSCOPIC METHODS IN ENSURING THE QUALITY OF THE EMERGENCY SURGICAL SERVICE

Chapter 1 consists of 3 subchapters and reflects the literature review, which was carried out by accessing the Scopus database (in accordance with the methodological framework suggested by Arksey and O'Malley, year 2005) and the Google-Scholar search engine. 99 bibliographic sources were analyzed: 79 articles, 8 monographs, 4 guides, 8 sources that determine the legal framework of the emergency surgical service in the Republic of Moldova. The bibliographic sources are related to both medical and economic topics. The interplay of these domains is inevitable in the case of cost-effectiveness analysis in the acute abdomen. The research of data from the specialized literature was carried out with the aim of determining the degree of implementation of laparoscopy in the acute abdomen through the prism of cost-effectiveness in the public health system, both at the international and national level.

1.1 The evolutionary historical axis of the management of the emergency surgical service in the Republic of Moldova

The evolutionary historical axis of the management of the emergency surgical service in the Republic of Moldova - reflects the dynamics of the development of the surgical service in abdominal emergencies and the impact of the legal framework in

the phasing of urgent medical assistance in the Republic of Moldova with the identification of benefits both for emergency medical service providers and for patients with abdominal emergencies.

1.2 Implementation of medical acts (methods/procedures/technologies) through the prism of cost-effectiveness analysis in the public health system

In subsection 1.2 „Implementation of medical acts (methods / procedures / technologies) through the prism of cost-effectiveness analysis in the public health system” is demonstrated the historical evolution of the development of economic tools for cost-effectiveness analysis in various fields, and the impact of the implementation of these economic evaluation tools in the health system both internationally and nationally. It was essential to identify the influence of the results of these economic evaluations on the promotion and implementation of minimally invasive surgery.

1.3 The essence and content of the concept of cost-effectiveness analysis

In subsection 1.3 „The essence and content of the concept of cost-effectiveness analysis” in the medical system” the theoretical framework of cost-effectiveness analysis is described. The conclusions from chapter 1 argue the need to promote CEA surgical interventions in the acute abdomen, having an impact both in the evaluation of treatment quality criteria and a decisive one in the selection of laparoscopic surgical techniques with beneficial consequences for the patient both in terms of curative and economic aspects institutional.

2. RESEARCH METHODOLOGY

2.1 The general characteristic of the research

The work is the result of an analytical study, in which the quality assurance of the emergency surgical service in AA served as the object of the research and allowed the elucidation of the degree of implementation of laparoscopic methods in the management of abdominal surgical emergencies in the Republic of Moldova.

The subjects of the research were:

- appreciation of the evolutionary historical axis of emergency surgical service management in the Republic of Moldova;
- the implementation of medical documents through the prism of cost-effectiveness analysis in the public health system;
- appreciation of the essence and content of the concept of „cost-effectiveness analysis” in the medical system;
- the assessment of the quality of acute abdomen treatment in the emergency surgical service through the lens of the clinical and economic evaluation of the treatment methods (traditional/laparoscopic) applied in AA;
- arguing the need to optimize the management of the emergency surgical service in the Republic of Moldova.

The scientific research was carried out in 4 stages during the years 2018-2022. Stage I: *Identification of the theoretical framework for the implementation of laparoscopic methods in ensuring the quality of the emergency surgical service in the Republic of Moldova and internationally*; Stage II: *Collection of primary material, identification of research methods and statistical data processing*; Stage III: *Analysis and synthesis of research results*; Stage IV: *Elaboration of conclusions and practical*

recommendations in order to implement minimally invasive surgical methods to optimize the quality of the emergency surgical service.

In order to achieve the set goals and objectives, an analytical study was planned and carried out to evaluate the surgical treatment (laparoscopic/traditional method) in patients with similar acute abdominal conditions who were treated within the Institute of Emergency Medicine, Department of Surgery, in the period June 19, 2018 – October 1, 2020. The results of the clinical and economic evaluation study of the quality of surgical treatment in patients with AA, were measured in the assessment of the criteria of quality, cost-effectiveness and practical applicability of surgical interventions in AA (figure 1).

The conducted study was a randomized one, the patients included in the research were divided into two groups in compliance with the inclusion and exclusion criteria.

- The research group (L1) consisted of 104 patients with acute abdomen treated laparoscopically: 52 patients after laparoscopic cholecystectomy (LCE), 52 patients after laparoscopy (LS).

- The control group (L0) consisted of 104 patients with acute abdomen treated by the classical surgical method: 52 patients treated by traditional cholecystectomy (TCE), 52 patients treated by traditional diagnostic laparotomy (LT).

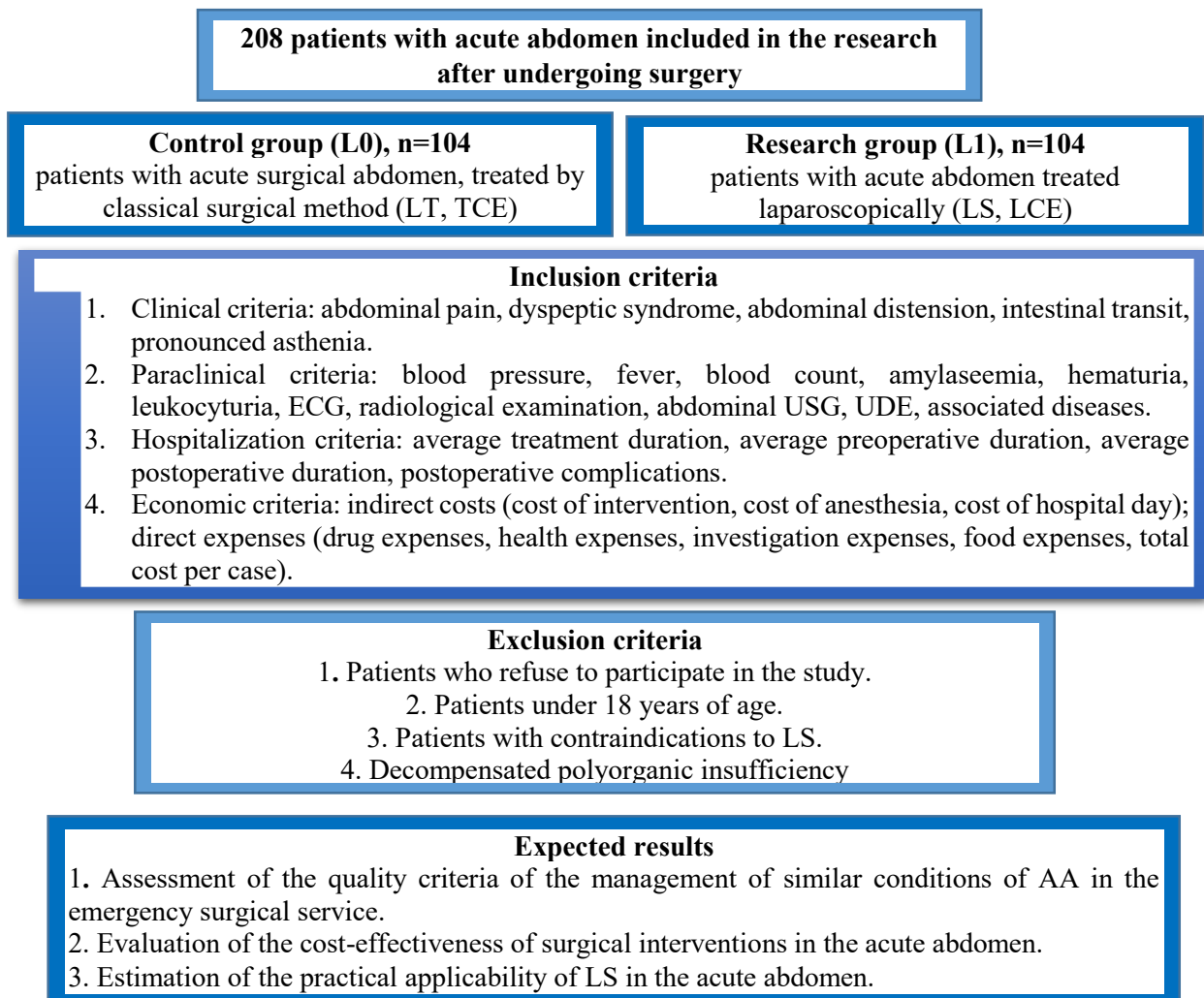


Figure 1. Research design

Thanks to the analytical nature of the research, the following quality criteria were identified that allow the comparison of the effectiveness of the treatment of similar AA conditions: average duration of hospitalization; average duration of loss of work capacity; treatment tactic selected to address similar AA conditions; operativeness of the provision of surgical medical assistance in relation to the time from the moment of referral to the Department of Emergency Medicine, which characterizes the patient's accessibility to the necessary medical act; morbidity dependent on the insured medical act, traditional/laparoscopic surgical intervention (intra/postoperative complications); the need for surgical reintervention to resolve complications; evolution of the postoperative period; general condition of patients at discharge.

2.2 Research methods

The conducted study was based on the application of research methods, as follows: history; document analysis; direct methods (questionnaire; interview); indirect methods; statistical method; the economic method; the method of unity between analysis and synthesis; synthesis.

The accumulated data were processed mathematically, statistically, analytically. Comparison, statistical and economic methods were useful for solving the objectives. The application of economic tools in research allowed the implementation of the economic method, which was based on the cost-effectiveness analysis (CEA), which is an economic concept described in the specialized literature with a view to practical applicability, so that it becomes an operational tool [28].

2.3. Mathematical methods of calculation

For the statistical analysis of the information, the processing of the data accumulated in the questionnaire was applied through the Microsoft Excel program, which were later analyzed through the statistical software IBM SPSS Statistics 26. The Kornogorov-Smirnov test was applied to assess the normality of the data distribution. The descriptive statistical analysis was performed based on the assessment of the Mean, Median, IQR (interquartile range). The comparative analysis of the groups (L0 and L1) was performed based on statistical tests: Chi-Square Test (statistical test χ^2); the χ^2 continuity test (Continuity Correction), and the Yates Correction for continuity was useful in the comparative analysis of categorical data for 2x2 tables. The statistical method Anova (Table ANOVA) was used to test differences between two and more methods, to test general differences as well as specific differences between the treatment methods compared. Through this method, the statistical significance of one or more factors was evaluated by comparing the response variable means at different factor levels. Fisher's test, ANOVA F - test was used to assess whether one of the evaluated treatments is on average more effective or less effective. The test was performed to detect any of several possible differences. In order to achieve the expected results and achieve the objectives, a mathematical calculation method was developed to facilitate the comparative evaluation of the cost-effectiveness of traditional/laparoscopic surgical interventions in the treatment of acute abdomen with the aim of arguing the quality of the treatment of similar conditions of AA within the surgical service of expedite. The proposed mathematical calculation formulas aim to

appreciate the updated value of costs (VC); Incremental approach; Cost-Effectiveness Ratio (CER); Efficiency-Cost ratio (EC).

- Present *value of costs (VC)* is necessary because costs can change from one year to another, and to be able to compare alternative treatment options in similar states of AA, this phenomenon must be taken into account, thus ensuring a correct analysis.
- *The incremental/differential approach* is based on relating incremental costs to incremental effects. This report suggests how much more to pay to select a more beneficial treatment.
- *The cost-effectiveness ratio (CER)* demonstrates how many times the respective method is more effective. The determination of CER was achieved by determining the result of the ratio between the average value of the treated case, to the effect expressed by the number of patients saved.
- *The efficiency-cost ratio (EC)* is a statistical indicator, calculated by the ratio between the efficiency resulting from the application of the surgical intervention variant and its cost.

3. EVALUATION OF THE QUALITY OF ACUTE ABDOMINAL TREATMENT METHODS IN THE EMERGENCY SURGICAL DEPARTMENT

3.1 Clinical evaluation of acute abdomen treatment methods in the emergency surgical service

The clinical evaluation of the control and research groups allowed their comparison with the subsequent identification of criteria that characterize the quality of treatment of similar acute abdominal conditions. In terms of group structure, different ratios between men and women were identified in the groups of subjects involved in the research. In the research group, female patients predominated, representing 66 (68,6%), and in the control group - 54 people (56,2%), no significant statistical difference was found ($\chi^2=2,853$; $fd=1$; $p=0,091$), (table 1).

With reference to the average age, in the control group the average age value was $57,3 \pm 1,7$ (CI 95% [53,9 – 60,7]) years, and in the research group (L1) $49,3 \pm 1,7$ (CI 95% [46,1 – 52,5]) years, the significant statistical difference being attested ($F=11,396$; $p<0,0001$). In the control group and in the research group, the patients were medically insured in more than 90% of cases, no statistical difference was found ($\chi^2=7,175$; $fd=1$; $p=0,0074$). Patients from the urban environment predominated in the structure of the living environment criterion (table 1).

Employed persons were included in the study. Thus, the parameter, the duration of the loss of work capacity, is important in both social and economic aspects, because it determines the time of return to work, with subsequent economic impact both for the individual patient and for society.

The duration of temporary work incapacity in the research group was $13,3 \pm 0,7$ (95% CI [12,1 – 14,7]) days, and in the control group the average value of temporary work incapacity was $19,8 \pm 0,9$ (CI 95% [18,1 – 21,6]) days, a significant statistical difference being attested ($F=36,678$; $p<0,0001$).

In this aspect, minimally invasive surgical interventions are more beneficial for the patient, ensuring minimal trauma and faster postoperative rehabilitation compared to classic surgical interventions.

Table 1. Comparative evaluation of demographic criteria

Criteria		Control group (L0), n=104 patients		Rezearch group (L1), n=104 patients		Comparison of proportions		
		Abs.	%	Abs.	%	χ^2	FD	p
1	Men	50	48,1	38	36,5	2,853	1	0,091
2	Women	54	51,9	66	63,5	2,853	1	0,091
3	Urban living environment	86	82,7	88	84,6	0,137	1	0,712
4	Employed in the field of work	34	32,7	63	60,6	16,186	1	0,0001
5	Mandatory medical insurance	104	100	97	93,3	7,175	1	0,0074
Criteria		Control group (L0), n=104 patients		Rezearch group (L1), n=104 patients		Comparing environments		
						t-statistic	FD	p
6	Average age (age)	57,3±1,7 (CI 95% [53,9–60,7])		49,3±1,7 (CI 95% [46,1–52,5])		-33,93	206	<0,0001

According to the addressability criterion in DMU in relation to the time elapsed since the onset of abdominal pain, it was found that both in the control group (L0) -72 (69,2%) patients, and in the research group (L1) - 71 (68,3%) people, addressed between 24-72 hours from the onset, thus a non-significant statistical difference is attested ($\chi^2=0,02$; $g1=1$; $p=0,889$), (figure 2).

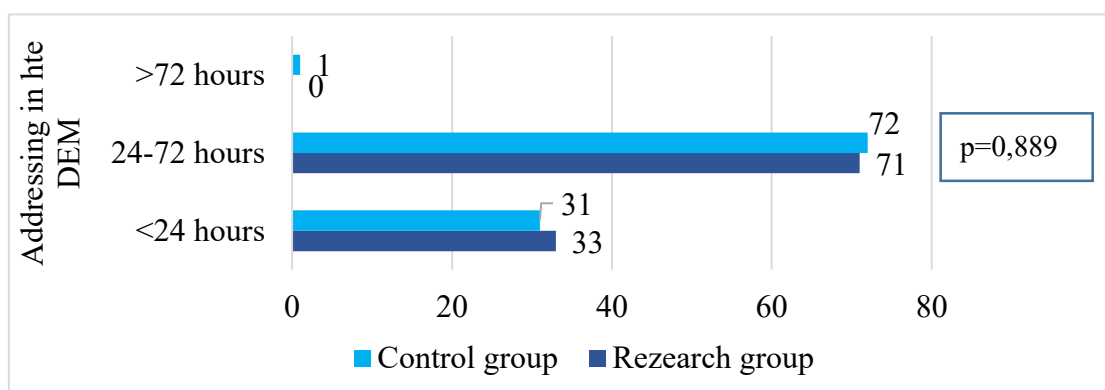


Figure 2. Comparative evaluation of groups according to the criterion of addressability of patients in the DMU after the onset of the disease (abs)

Patients who required a surgical approach were hospitalized in the surgery department of the IMSP IMU, and the distribution in the surgical wards was heterogeneous and dependent on the identification of the cause of the abdominal pain. Only in the research group were identified 16 (15,4%) people who required treatment in the gynecology department, the statistical difference being significant ($\chi^2=17,269$; $fg=1$; $p<0,0001$).

The clinical and paraclinical evaluation in both the research group and the control group demonstrated the homogenous persistence of the algic, dyspeptic, febrile, asthenic syndromes and the similarity of the results of the paraclinical evaluation, which confirms a similar treatment of the patient with abdominal pain in the DEM of PHMI Institute of Emergency Medicine, with subsequent impact on the determination of treatment tactics. Cardiopneumopathy ($\chi^2=0,573$; $fg=1$; $p=0,449$) and obesity

predominated in the associated diseases both in the control group and in the research group, the statistical difference being insignificant ($\chi^2=0,113$; $gl=1$; $p=0,737$), fact reflected in table 2.

Table 2. **Comparative incidence of associated diseases in patients included in the research**

Associated diseases		Control group, n=104		Rezeach group, n=104		Comparison of proportions		
		Abs.	%	Abs.	%	χ^2	FD	p
1	Obesity	28	29,1	26	27	0,113	1	0,737
2	Abdomen scar (L90.5)	7	7,3	10	10,4	0,617	1	0,432
3	Compensated liver cirrhosis	6	5,8	0	0	6,182	1	0,013
4	Cardio Pneumopathies	53	55,1	58	60,3	0,573	1	0,449
5	Associated trauma	8	7,7	4	3,8	1,452	1	0,228
	Total	102	98,1	98	94,2	2,126	1	0,145

In the case of patients who required LS, the 10,4% incidence of cicatricial abdomen, after previous surgical interventions, ($\chi^2=0,617$; $fg=1$; $p=0,432$), established risks and created conditions of technical difficulties during LS (table 2).

All patients who required traditional and minimally invasive surgical interventions were consulted by the anesthesiologist, who qualified the anesthetic risk according to the ASA score. Due to the associated strengths identified, the ASA III score was predominant in both the control and research groups (figure 3).

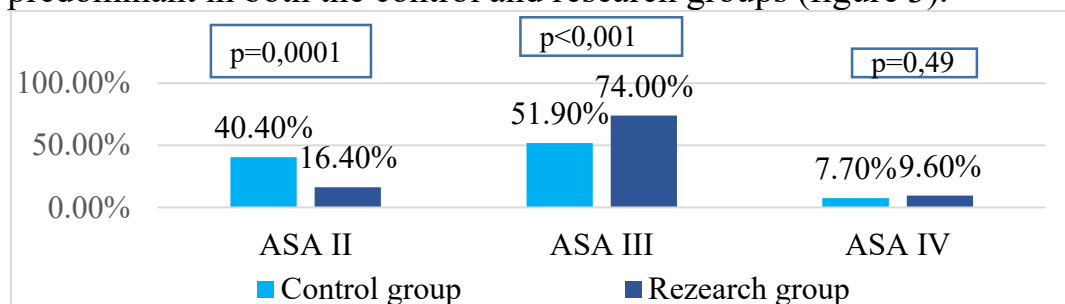


Figure 3. **Comparative assessment of anesthetic risk in L0 and L1, (%)**

The results of the clinical and paraclinical evaluation allowed the specialists to establish the preoperative diagnosis in each analyzed subgroup. In the research group, the diagnosis of acute cholecystitis prevailed in 48 (46,1%) patients, and again in the control group in 33 (31,7%) patients ($\chi^2=4,515$; $fg=1$; $p=0,0336$), (table 3).

Table 3. **Preoperative diagnosis in patients included in the research**

Preoperative diagnosis		Control group, n=104		Rezeach group, n=104		Comparison of proportions		
		Abs.	%	Abs.	%	χ^2	FD	p
1	Acute abdomen	28	26,9	22	21,1	0,954	1	0,329
2	Acute appendicitis	4	3,9	14	13,5	6,004	1	0,014
3	Perforated ulcer	1	1	1	1	0,000	1	1
4	Acute gynecological ptology	2	1,9	2	1,9	5,662	1	0,017
5	Mesenteric thrombosis	1	1	1	1	0,000	1	1
6	Acute pancreatitis	12	11,5	10	9,6	0,198	1	0,656
7	Acute post-traumatic abdomen	7	6,7	3	2,9	1,635	1	0,201
8	Acute cholecystitis	33	31,7	48	46,1	4,515	1	0,0336
9	Bowel obstruction	16	15,4	3	2,9	9,727	1	0,0018

Acute abdomen in the research group was suspected in 22 (21,1%) patients, and in the control group in 28 (26.9%) cases, thus no significant statistical difference is found in this criterion ($\chi^2=0,954$; fg=1; p=0,329), (table 3).

With reference to the postoperative diagnosis, the presence of acute surgical pathology was excluded in 15 (14,3%) patients in the research group and in one patient in the control group ($\chi^2=12,957$; fg=1; p=0,0003). The postoperative diagnosis of acute cholecystitis prevailed in both groups equally representing 52 (51%) patients, due to the CET, CEL subgroups. Gynecological pathology had a higher incidence in the research group, being represented by 16 (15,3%) patients, thus confirming a significant statistical difference ($\chi^2=11,822$; fg=1; p=0,0006), (table 4).

Table 4. Postoperative diagnosis in the control group and in the research group

Postoperative diagnosis		Control group, n=104		Research group, n=104		Comparison of proportions		
		Abs.	%	Abs.	%	χ^2	FD	p
1.	No visible pathology	1	1	15	14,3	12,957	1	0,0003
2.	Acute appendicitis	9	8,6	7	6,7	0,264	1	0,6071
3.	Gynecological pathology	2	1,9	16	15,3	11,82	1	0,0006
4.	Acute pancreatitis	2	1,9	5	4,8	1,344	1	0,246
5.	Perforated ulcer	3	2,9	1	1	0,977	1	0,323
6.	Acute cholecystitis	52	51	52	51	0,000	1	1,000
7.	Mesenteric thrombosis	4	3,8	1	1	1,732	1	0,188
8.	Purulent peritonitis	5	4,8	1	1	2,654	1	0,1033
9.	Adherent process of the abdominal cavity	12	11,5	2	1,9	7,630	1	0,0057
10.	Liver cirrhosis	0	0	1	1	1,040	1	0,3078
11.	Abdominal trauma	6	5,8	1	1	3,630	1	0,0567
12.	Abd cavity organ tumors.	7	6,7	1	1	4,542	1	0,0331
13.	Enteritis	0	0	1	1	1,040	1	0,3078
14.	Retroperitoneal hematoma	1	1	-	-	1,040	1	0,3078
Total		104	100	104	100	-		

The method of surgical treatment was different in each group. In the research group, LS was recommended to all patients, in 47 (45,2%) - it had diagnostic value ($\chi^2=16,024$; fd=1; p=0,0001), and in 57 (54,8%) - curative value ($\chi^2=74,462$; fd=1; p<0,0001). In the control group exploratory laparotomy prevailed in 22 (21,2%) patients ($\chi^2=24,544$; fd=1; p<0,0001), and definitive surgical treatment in 61 (58,6%) patients, thus confirming a significant statistical difference ($\chi^2=85,786$; fd=1; p<0,0001), (figure 4).

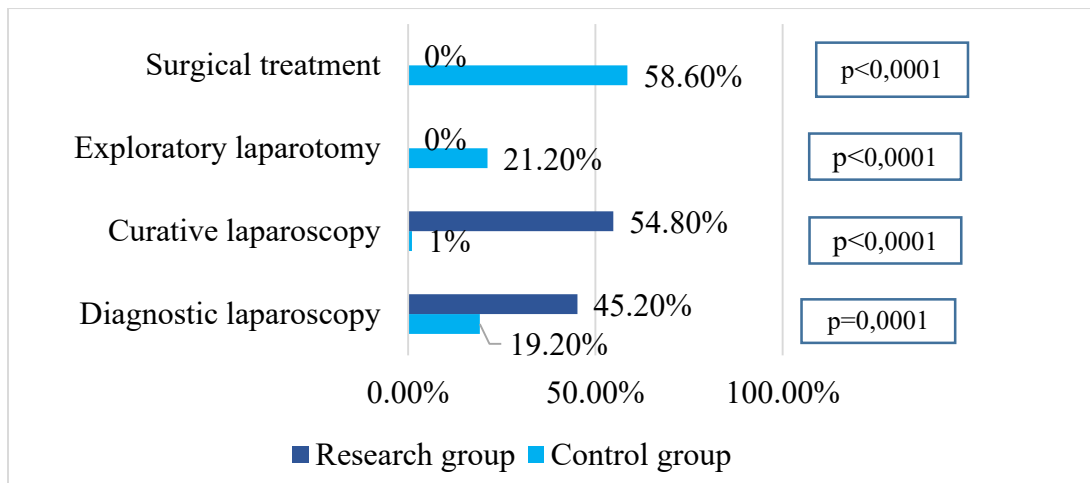


Figure 4. **Comparative assessment of surgical treatment methods in the control group and the research group (%)**

In accordance with the accessibility to surgical treatment in accordance with the temporal criterion, which assesses the degree of urgency of the surgical intervention, it was found that in the control group, extreme emergencies constituted 13 (12,5%) cases, with delayed emergencies predominating, similar to the group of research, where extreme emergencies were in 16 (15,4%) patients ($\chi^2=0,363$; fd=1; p=0,547). In the control group, the emergencies were postponed in 67 (64,4%) patients, and in the research group in 53 (51%) patients, thus no significant statistical difference is attested ($\chi^2=3,807$; fd=1; p= 0,051), (figure 5).

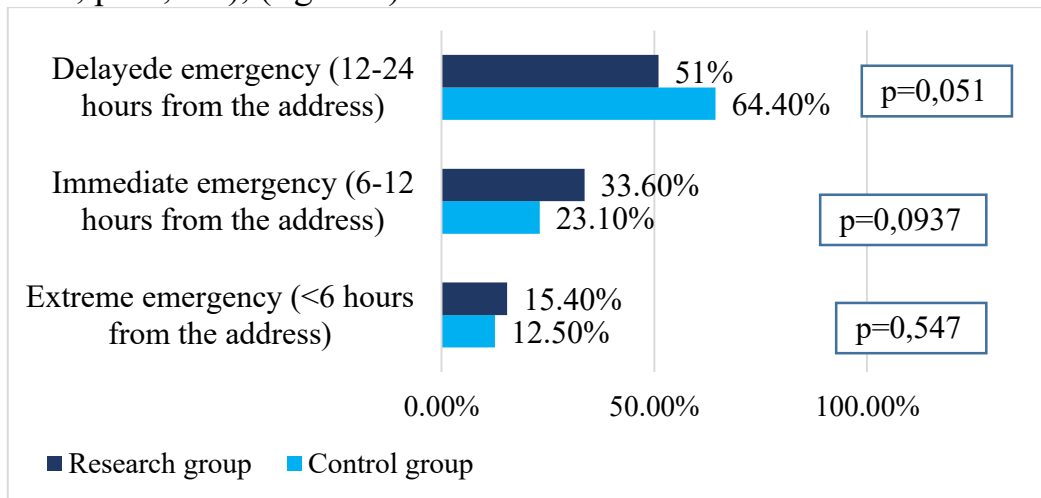


Figure 5. **Distribution of surgical interventions according to the degree of urgency (%)**

Intraoperative complications in the control group were present in 8 (7,7%) patients, and in the research group in 4 (3,8%) patients, confirming an insignificant statistical difference ($\chi^2=1,452$; fd=1; p= 0,2281). Early postoperative complications were numerically similar in both groups, 7 (6,7%) patients each, and late ones predominated in the control group, being identified in 9 (8,6%) patients, thus identifying a significant statistical difference ($\chi^2=6,541$; fd=1; p=0,0105). Surgical reinterventions to resolve complications were needed both in the research group in 10 (9,6%) patients and in the control group in 12 (11,5%) patients, the statistical difference being relatively significant ($\chi^2=0,198$; fd=1; p=0,6564), (table 5).

Table 5. Comparative incidence of intra/postoperative complications, surgical reintervention in research and control groups

Risky effects for the intra/post operative patient		Research group, n=104		Control group, n=104		Comparison of proportions		
		Abs.	%	Abs.	%	χ^2	FD	p
1.	Intraoperative complications	4	3,8	8	7,7	1,452	1	0,2281
2.	No intraoperative complications	100	96,1	96	92,3	1,368	1	0,2422
3.	Early postoperative complications	7	6,7	7	6,7	0,000	1	1,000
4.	Late postoperative complications	1	1	9	8,6	6,541	1	0,0105
5.	No postoperative complications	96	92,3	88	84,6	3,003	1	0,0831
6.	Surgical reintervention	10	9,6	12	11,5	0,198	1	0,6564

In the study, the evolution of the postoperative period was based on the monitoring of the duration of intestinal paresis, the suppression of the drain from the peritoneal cavity, the postoperative mobilization of the patient. Thus, it was found that in the case of minimally invasive surgical interventions, intestinal transit was restored in the first 24 hours postoperatively in over 67 (64,4%) patients, compared to traditional surgical interventions in the control group where intestinal peristalsis was restored over 48 hours postoperatively in 65 (62,5%) patients, ensuring a statistically significant difference ($\chi^2=14,984$; fg=1; p=0,0001). Patients were able to move independently in the first 24 hours after laparoscopic interventions in 89 (85,6%) cases, compared to the control group in which postoperative mobilization predominated over 24 hours in 96 (92,3%) patients, the statistical difference being significant ($\chi^2=126,183$; fd=1; p<0,0001). Suppression of the drain from the peritoneal cavity in the first 24 hours postoperatively was performed in 42 (40,4%) patients from the research group, and in the control group the removal of the drain was not recorded in the first 24 hours postoperatively, the statistical difference being significant in this aspect ($\chi^2=52,398$; gl=1; p<0,0001). In the control group in 74 (71,1%) patients the drain was removed after 72 hours postoperatively, and in the research group in 62 (59,6%) cases, the drain was removed in 48-72 hours postoperatively, the statistical difference being insignificant ($\chi^2=3,022$; gl=1; p=0,0821), (figure 6).

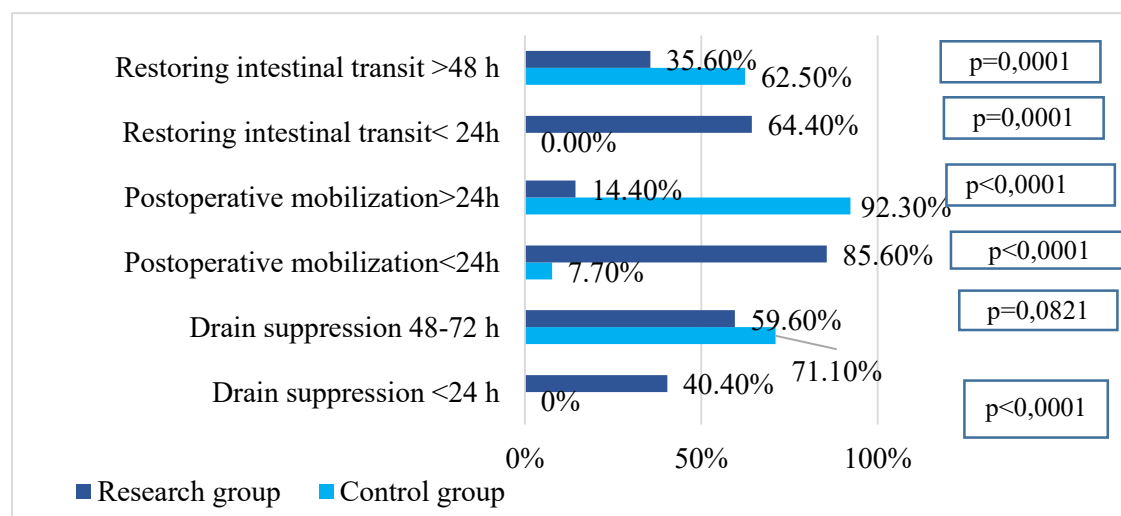


Figure 6. Comparative analysis of postoperative evolution in the control group and in the research group (%)

The evaluation of the general condition at discharge of the patients in the study showed that most of them were discharged in a satisfactory general condition. In the control group, 12 (11,5%) patients died, while in the research group, 4 (3,8%) people died, so the statistical difference is significant ($\chi^2=4,343$; $fg=1$; $p=0,0372$), (table 6).

Table 6. Comparative assessment of the general condition of patients at discharge in the control and research groups

The patient's condition at discharge		Research group, n=104		Control group, n=104		Comparison of proportions		
		Abs.	%	Abs.	%	χ^2	FG	p
1.	Good general condition	11	10,6	4	3,8	3,581	1	0,0584
2.	Satisfactory overall condition	84	80,8	79	76	0,704	1	0,4014
3.	General condition medium severity	5	4,8	9	8,7	1,251	1	0,2635
4.	Deceased	4	3,8	12	11,5	4,343	1	0,0372

In the control group, the average length of hospitalization was $10,9 \pm 0,72$ (CI 95% [9,6 – 12,5]) days, and in the research group the average length of hospitalization was $8,3 \pm 0,8$ (CI 95% [6,9 – 9,9]) days, a significant statistical difference being observed ($F=6,15$; $p=0,014$).

3.2 Assessing the quality of acute abdomen treatment in the emergency surgical service

The comparative evaluation of the control group and the research group made it possible to identify some criteria that argue for the quality of medical care in similar states of AA within the emergency surgical service with subsequent impact on the assessment of the cost of the treated case. The quality criteria identified were: average length of hospitalization; average duration of loss of work capacity; the treatment tactic selected to address similar AA conditions; the efficiency of the provision of surgical medical assistance in relation to the time from the moment of addressing in the DMU that characterizes the patient's accessibility to the necessary medical act; morbidity depending on the insured medical act, traditional/laparoscopic surgical intervention (intra/post-operative complications); the need for surgical reintervention to resolve complications; evolution of the postoperative period; general condition of patients at discharge.

As a result of the comparative analysis of the control group and the research group, it was found that the laparoscopic interventions in the L1 research group (CEL and LS) proved to be more effective than the classic surgical ones in L0. In the control group, the average length of hospitalization was $10,9 \pm 0,72$ (CI 95% [9,6 – 12,5]) days, and in the research group the average length of hospitalization was $8,3 \pm 0,8$ (CI 95% [6,9 – 9,9]) days, a significant statistical difference being observed ($F=6,15$; $p=0,014$). In the case of laparoscopic interventions in similar states of AA, the postoperative evolution, with the faster restoration, in the first 24 hours postoperatively of the suggestive and descriptive parameters of the patient's autonomy (intestinal peristalsis, early postoperative mobilization, removal of the drain from the peritoneal cavity) was more favorable, compared to classic surgical interventions (figure 6).

Reduced incidence of intraoperative/postoperative complications 11,5% (CI 95% [3,8 – 20,5]) in the research group compared to 23,1% (CI 95% [12,3 – 35,3]) in control group and of surgical reinterventions required in 9,6% (CI 95% [2,0 – 18,2]) cases in the research group, compared to 11,5% (CI 95% [3,8 – 21,0]) cases in the

control group, conditioned the reduction of the duration of hospitalization and the temporary loss of work capacity, having a direct impact on the lower cost of the case treated in the research group compared to the control group in which the surgical interventions were performed traditional. Diagnostic laparoscopy, in the research group, in 42,3% (CI 95% [28,6 – 56,2]) cases conditioned the avoidance of unsubstantiated surgical interventions: in 28,8% (CI 95% [17,0 – 42,2]) patients, acute surgical pathology was excluded, and in 13,5% (CI 95% [4,5 – 21,0]) patients it had curative value.

The duration of temporary work incapacity in the research group was $13,3 \pm 0,7$ (CI 95% [12,1 – 14,7]) days, and in the control group the average value of temporary work incapacity was $19,8 \pm 0,9$ (CI 95% [18,1 – 21,6]) days, a significant statistical difference being attested ($F=36,678$; $p<0,001$). The evaluation of the general condition at discharge of the patients in the study showed that the majority were discharged in a satisfactory general condition, however, in the control group 11,5% (CI 95% [2,5 – 21,7]) patients died, while in the research group, the deceased constituted 3,8% (CI 95% [0,0 – 10,2]) people, thus the statistical difference being significant ($\chi^2=4,343$; $g1=1$; $p=0,0372$). In this aspect, laparoscopic surgical interventions are more beneficial for the patient, ensuring minimal trauma and faster postoperative rehabilitation compared to classical surgical interventions (table 6).

4. OPTIMIZING THE MANAGEMENT OF THE EMERGENCY SURGICAL SERVICE

4.1 Economic evaluation of diagnostic curative methods in the acute abdomen

In the economic evaluation of surgical interventions, such types of analysis as cost-effectiveness analysis (CEA), cost-benefit analysis (CBA), cost-utility analysis (CUA) are useful [13]. Cost-effectiveness analysis (CEA) is an economic tool for identifying and selecting an alternative solution to achieve the same objective, but which is not quantified in monetary units of measure, but in physical units of measure. CEA is an alternative or complementary tool of the Cost-Benefit Analysis (CBA), reflecting the reduction of the impact of the disease, provided by the specific intervention required, with the cost of this intervention. Comparison of laparoscopic and classical (traditional) surgical interventions, and their classification according to the costs necessary to achieve the established objectives can be carried out based on the results of the calculation of the cost-effectiveness ratio (CER), the efficiency-cost ratio (EC) [13]. The most efficient method is the one that allows the achievement of the objective by consuming the fewest resources. The advantage of CEA compared to CBA is that it is less expensive, easier to achieve when social benefits and costs are difficult to monetize, and the expression of benefits does not require capitalization in monetary terms [13, 21]. Another advantage is that CEA influences the decision-making with reference to which alternative method maximizes the benefits expressed in physical terms, for the same costs, or on the contrary, which decreases the costs to achieve the same objective, ensuring the argumentation of the quality of the medical act. The economic evaluation of AA treatment helped to identify the costs that form the cost of the treated case and the clinical parameters that determine the flexibility of these costs (table 7).

Table 7. Comparative evaluation of the costs of cases treated in the control (L0, n=104) and research (L1, n=104) groups, through descriptive statistical tests, CI 95%

Costs/Expenses	Minimum		Maximum		Mean CI 95%		Median		IQR	
	L0	L1	L0	L1	L0	L1	L0	L1	L0	L1
Temporary incapacity for work (days)	1	3	60	50	19,8	13,3	20	11	10	5
Duration of surgery (minutes)	20	10	310	260	100,3	59,38	90	45	63,75	33,75
Cost of surgery (lei)	682	1144	7699	6524	2772,8	1925,6	2251	1886	1702	309
Duration of anesthesia (minutes)	55	30	330	500	138,6	108,9	120	87,5	80	60
Cost of anesthesia (lei)	1049	216	4553	7667	2267,7	1973,4	2166	1923,5	980	825,2
Duration of hospitalization (days)	1	1	49	49	10,9	8,3	10	6	8	5
Cost per day/bed (lei)	288	152,9	31423	26941,2	5320,6	3579,4	3971	1824	3562	2546
Medicine expenses (lei)	113,4	152	19616,2	26941,2	1923,3	1493,6	1302,8	669,9	1096,3	724,4
Sanitary expenses (lei)	0,0	1,87	6838,9	3028,9	204,7	115,8	68,5	28,3	124,8	42,8
Investigation expenses (lei)	10,2	0,0	29154	32799	3871	2665,7	2208	1523	3668,2	2198
Food expenses (lei)	0,0	0,0	1041,7	1547,2	302,9	257,4	288,3	210,9	198,8	146,5
Total cost of treated case (lei)	4520	4168,5	89843,4	89503,7	16728,1	11997,5	13468,9	8151,9	9824,8	5408,7

Reducing the duration of hospitalization, the duration of surgical intervention, the duration of general anesthesia, ensures the reduction of expenses related to the maintenance of these patients: for drugs, for food, for sanitary services, determining a lower cost per case of acute abdomen treated with laparoscopic surgery compared to the treated case, classical surgical approach, thus in the research group the cost of the treated case was $11997,5 \pm 1186,4$ (CI 95% [9846,8 – 14473,3]) lei, and in the control group it was $16728,1 \pm 1157,1$ (CI 95% [14673 – 19096,1]) lei, a significant statistical difference being attested ($F=7,847$; $p=0,006$), (table 7). This fact confirms that laparoscopic interventions in similar states of AA are less expensive than traditional ones, ensuring not only clinical benefits for the patient but also economic benefits both at the institutional level and for the beneficiary.

4.2 The quality of laparoscopic and classic surgical interventions in similar acute abdomen conditions from the perspective of cost - effectiveness evaluation

The comparison of laparoscopic and classical (traditional) surgical interventions, and their classification according to the costs necessary to achieve the established objectives can be carried out based on the results of the calculation of the cost-

effectiveness ratio (CER), the cost-effectiveness ratio (EC) and on the basis of the analysis incremental [13]. The most efficient method is the one that allows the achievement of the objective by consuming the fewest resources.

The difference between the incremental cost and the average cost of the treated case was positive, both in the research group and in the control group, demonstrating the need for additional expenses, which influenced the increase in the cost of the treated case. The incremental approach in the research group was higher compared to the control group, which confirms that in case of complications after laparoscopic surgery, higher additional costs of the treated case are possible. The comparison of laparoscopic and classical (traditional) surgical interventions, and their classification according to the costs necessary to achieve the established objectives can be carried out based on the results of calculating the cost-effectiveness ratio (CER), the cost-effectiveness ratio (EC) and on the basis of the incremental analysis [13]. The most efficient method is the one that allows the achievement of the objective by consuming the fewest resources.

The value of the cost-effectiveness ratio (CER) is higher in the control group CER (L0) = 181,8 compared to the research group CER (L1) = 119,9, and the ratio between CER(L0)/CER(L1) = 1,5, which proves that traditional surgical interventions are more expensive than laparoscopic ones. In the case of laparoscopic interventions, the EC (L1) is 0,0083, being higher compared to the EC in the control group (L0) – 0,0055, which proves that the average efficiency per unit of cost is higher in the case of minimal surgical interventions invasive (LS, LCE), compared to traditional surgical ones (table 8).

Table 8. Evaluation of cost-effectiveness ratio and efficiency-cost ratio in TCE/LCE and LT/LS surgical interventions

Variables Costs and effects	Type of surgery					
	TCE, n=52	LCE, n=52	LT, n=52	LS, n=52	L0, n=104	L1, n=104
Average cost of a treated case, CI 95%, (lei)	15569,5	10537,3	17886,7	13457,3	16728,1	11997,5
Effect (number of lives saved)	51	52	41	48	92	100
CE rate (C/E), cost per life saved	305,3	202,6	436,3	280,4	181,8	119,9
EC rate (E/C), lives saved at cost	0,0033	0,0049	0,0023	0,0036	0,0055	0,0083

4.3 Optimizing the management of the emergency surgical service in the approach of similar AA salts

It is inevitable to appreciate the need to optimize the management of the emergency surgical service without ascertaining the impact of the quality indicators on the efficiency and effectiveness of the medical act in similar states of AA, in order to appreciate which treatment tactic is more welcome both for the beneficiary and for the provider of medical services Public Health Medical Institution Institute of Emergency

Medicine (PHMI IEM). For this purpose, it is useful to apply the Donabedian model [27], that allows the identification of the structure, the process, the quality results of the medical services provided in AA, their comparison, and the identification of the benefits for the IMSP and for the patient (table 9).

Table 4. Comparative evaluation of the quality of the medical act in similar states of AA through the lens of the Donabedian model (developed by the author)

Structure indicators		Process indicators		Results indicators	
L0, n=104	L1, n=104	L0, n=104	L1, n=104	L0, n=104	L1, n=104
1. Institute of Emergency Medicine, Department of Emergency Medicine, Department of Surgery; 2. Equipment and necessary supplies; 3. Human resources for providing medical assistance within the Institute of Emergency Medicine; 4. Identification of the beneficiary of medical services provided for similar conditions of AA; 5. Financial resources.		1. Diagnostic services		1. Similar	
		2. Treatment services		2. Intervention cost, lei	
		LT; TCE	LS, LCE	2772,8	1925,6
		3. Average length of hospitalization, days		3. Duration of loss of work capacity, days	
		10,9	8,3	19,8	13,3
				Major surgical trauma	Minimal surgical trauma
		4. Duration of the surgical intervention, min.		4. Direct costs	
		100,3	59,4	Bigger	More reduced
		5. Duration of anesthesia, minutes		5. Cost of anesthesia, lei	
		138,6	108,9	2267,7	1973,4
		6. Accessibility of surgical intervention		6. Morbidity (Complications in the perioperative period)	
		Postponed emergencies predominate	Tendency for delayed and immediate urgency	23	12
				7. Reintervention	
				12	10
		7. Evolution of the postoperative period		8. Lethality	
		11,5%	3,8%		
Postoperative recovery after 48-72 hours after the intervention.		Postoperative recovery the first 24 hours postoperatively.			
		9. Satisfaction of the medical service provider			
		CER			
		181,8	119,9		
		EC			
		0,0055	0,0083		
		10. The incremental approach			
		Higher expenses in case of incremental effects			
		11. Average cost of treated case, (lei)			
		16728,1	11997,5		

The clinical analysis of the batches conditioned the identification of the quality criteria: average duration of hospitalization; average duration of loss of work capacity; the treatment tactic selected to address similar AA conditions; operativeness of the provision of surgical medical assistance in relation to the time from the moment of addressing in the DEM that characterizes the accessibility of the patient to the necessary medical act; morbidity dependent on the insured medical act,

traditional/laparoscopic surgery (intra/postoperative complications); the need for surgical reintervention to resolve complications; evolution of the postoperative period; general condition of patients at discharge.

The economic analysis of the treated cases and the cost-effectiveness of the applied surgical treatment methods made possible the complex analysis of the research results. Thus, on the basis of a set of indicators, of clinical practice, of quality, which refer to a concrete clinical situation - similar conditions of AA approached laparoscopically or with traditional surgery, it was possible to objectify the level of quality, it was ascertained what is the effectiveness and safety of the act based on the information from the institutional medical files, the analysis tools of these diagnostic and treatment practices in AA were identified, the effects of the medical act were assessed to argue the objectives of improving the quality of AA treatment within the emergency surgical service. In this context, the Donabedian model through the structure indicators reflected what were the necessary conditions for providing medical care within the emergency surgical service, the process demonstrated the evolution of emergency medical care, and the results were essential because they reflected both the important effects for patient (survival, degree of recovery of functionality, duration of postoperative rehabilitation, postoperative aesthetic effect), as well as for the service provider who aspires to select the most efficient, effective method of treatment of similar conditions of AA, based on clinical, economic analysis.

Optimizing the management of abdominal emergencies, by implementing and promoting laparoscopic methods useful in AA, ensures the increase in the quality of medical assistance in the emergency surgery service with a direct impact on reducing risks for the patient, the public health system, as well as ensuring an economic benefit at the institutional level. This analysis suggests what are the strengths, opportunities, weaknesses in selecting one treatment tactic or another, while also highlighting the threats that condition risks for the implementation of laparoscopic methods in abdominal surgical emergencies.

4.4 Characteristics of the entity, the Institute of Emergency Medicine, where the research was carried out

The Institute of Emergency Medicine is a level 3 institution, according to the emergency service staging criteria, which has the strengths and opportunities that ensure the easy implementation of laparoscopic methods in the AA approach, in order to increase the quality of the surgical service in abdominal emergencies. CEA is the economic instrument that would confirm the quality of decision-making management at the institutional level. The limitation of CEA is that it cannot be applied to other medical institutions that do not have the professionals or the necessary technique for the laparoscopic surgical approach in AA.

GENERAL CONCLUSIONS

1. The evaluation of laparoscopic curative-diagnostic methods in the acute abdomen demonstrated that the laparoscopic examination ensured the avoidance of unwarranted laparotomy in 42,3% (CI 95% [28,6 – 56,2]) patients, by the fact that in 28,8% (CI 95% [17,0 – 42,2]) patients acute surgical pathology was excluded, and in 13,5% (CI 95% [4,5 – 21,0]) patients it had curative value.

2. The multi-criteria assessment of the quality of acute abdomen treatment demonstrated the efficiency of laparoscopic surgical interventions, due to minimal trauma, rapid postoperative recovery, low incidence of intra/postoperative complications and surgical reinterventions, a fact that conditioned the reduction of hospitalization duration which in the research group was $8,3 \pm 0,8$ (CI 95% [6,9 – 9,9]) days, and in the control $10,9 \pm 0,72$ (CI 95% [9,6 – 12,5]) days (F=6,15; p=0,014)) and the duration of temporary incapacity for work identified in the research group of $13,3 \pm 0,7$ (CI 95% [12,1 – 14,7]) days, and in the control group $19,8 \pm 0,9$ (CI 95% [18,1 – 21,6]) days (F=36,678; p<0,0001).
3. The economic evaluation of the surgical methods of treatment in acute abdomen, identified an average cost per case treated laparoscopically lower compared to the case treated, approached classically surgically, thus in the research group the average cost of the treated case was $11997,55 \pm 1186,403$ (CI 95% [9846,82 – 14473,34]) lei, and in the control group it was $16728,09 \pm 1157,11$ (CI 95% [14673 – 19096,12]) lei, being certified a significant statistical difference (F=7,847; p=0,006).
4. Laparoscopic interventions require lower expenses compared to classic ones, a fact confirmed by the result of the cost-effectiveness ratio between the control group and the research group, which is 1,5 and they have a higher average efficiency per unit of cost, compared to traditional ones, argument provided by the result of the assessment of the efficiency-cost ratio, which in the research group is 0,0083, and in the control group – 0,0055.
5. The results of the research contributed to solving the scientific problem by substantiating from a methodological point of view (clinical and economic analysis) the process of identifying the most effective methods of classical/laparoscopic surgical treatment of similar conditions of acute abdomen, a fact that confirmed the opportunity to optimize the management of abdominal emergencies by implementing laparoscopic methods in ensuring the quality of the emergency surgical service.

RECOMMENDATIONS

Proposals for the use of the results obtained in the medical field

1. The development of a Program for the promotion of laparoscopic surgery within the emergency surgical service would facilitate and ensure the implementation of laparoscopic techniques within the emergency surgical assistance, contributing to increasing the professional motivation of surgeons and forming a direct economic impact at the institutional level.
2. Revision of the National Clinical Protocols for the promotion of laparoscopic methods in the diagnosis and treatment of acute abdomen.
3. Implementation of economic tools, including cost-effectiveness analysis in the health field, which would allow a comparative approach of laparoscopic interventions in the acute abdomen, compared to traditional surgical ones, ensuring a recovery of expenses in relation to the benefits for the patient and the health system health at the same time.

4. Theoretical and practical training of potential managers the Public Health Medical Institution in view of the practical applicability of the economic analysis, of the cost-effectiveness analysis of interventions within the emergency surgical service, to identify the most effective techniques with a direct economic impact at the institutional level and in the same time, the most beneficial for the patient.
5. Ensuring the process of continuous medical education for the development of skills in the field of laparoscopic surgery and their practical application in the emergency surgical service.
6. Requesting and equipping the Public Health Medical Institutions with equipment, consumables necessary for the implementation of laparoscopic surgical interventions in the emergency surgical service.

The bibliography contains 99 bibliographic sources, of which 30,36% are represented by articles from the last 5 years, the period in which the research was carried out, and 19,35% - by bibliographic sources belonging to authors from the Republic of Moldova.

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INFORMATION REGARDING THE VALUATION OF RESEARCH RESULTS

LIST OF PUBLICATIONS AND SCIENTIFIC EVENTS

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• Articles in accredited national scientific journals:

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2. **Malacinschi-Codreanu T.** Evaluarea cost-eficienței laparoscopiei în abdomenul acut. În: Sănătate Publică, Economie și Management în Medicină. 2021. Nr. 1(88): 63-70. ISSN 1729-8687. [http://doi.org/10.52556/2587-3873.2021.1\(88\).08](http://doi.org/10.52556/2587-3873.2021.1(88).08)

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- **Invention patents, patents, registration certificates, materials for invention salons:**

22. **Malacinschi-Codreanu, T.;** Spinei, L.; Bernic, J.; Dolghii, A. Evaluarea calității metodelor de tratament al abdomenului acut în serviciul chirurgical de urgență. Adeverința privind înscrierea Seria OȘ Nr.7358 din 28 noiembrie 2022. Titularii drepturilor patrimoniale: IMSP Institutul de Medicină Urgentă; IP USMF „Nicolae Testemițanu” din Republica Moldova. <http://www.db.agepi.md/opere/SearchResult.aspx>.

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26. **Malacinschi-Codreanu T.,** Spinei L., Bernic J., Dolghii A. Implementarea chestionarului referitor la persoana care a acceptat participarea la studiul cu privire la estimarea cost-eficienței laparoscopiei prin prisma caracteristicilor curative-diagnostice în managementul abdomenului acut chirurgical. MS al RM, certificat de inovator nr. 5938, 2022. 08. 29.

- **Participation with communications at scientific forums:**

- ✓ **National**

27. **Malacinschi-Codreanu T.** Evaluarea laparoscopiei în urgențele medico-chirurgicale abdominale în cadrul IMSP IMU în perioada anilor 2015-2017. Conferința Științifică Anuală a Tinerilor specialiști din cadrul IMSP IMU

„Performanțe și perspective în urgențele medico-chirurgicale”. Chișinău, 18 mai 2018.

28. **Malacinschi-Codreanu T.** Laparoscopia - spre un diagnostic mai precis în chirurgia de urgență. Conferința Științifică Anuală IMSP IMU „Actualități și contraverse în managementul urgențelor medico-chirurgicale”. Chișinău, 7 decembrie 2018.
29. **Malacinschi-Codreanu T.** Evaluarea pacientului cu abdomen acut în departamentul de medicină de urgență Conferința științifică anuală USMF Nicolae Testemițanu „Cercetarea în biomedicină și sănătate: calitate, excelență și performanță”. Chișinău, 20-22 octombrie 2021.
30. **Malacinschi-Codreanu T.** Abordarea laparoscopică a abdomenului acut în IMSP Institutul de Medicină Urgentă. Conferința științifică anuală USMF Nicolae Testemițanu „Cercetarea în biomedicină și sănătate: calitate, excelență și performanță”. Chișinău, 19-21 octombrie 2022.

- **Participation with posters at scientific forums:**

- ✓ **International**

31. **Malacinschi-Codreanu T., Spinei L., Bernic J., Dolghii A.** Metoda aprecierii calității tratamentului abdomenului acut prin prisma metodelor noi a evaluării economice în serviciul chirurgical de urgență. 2022. 1-t edition of International exhibition of creativity and innovation Excellent IDEA. 21-23 September, Chișinău, Republic of Moldova.
32. **Malacinschi-Codreanu T.; Spinei L.; Bernic J.; Dolghii A.** Optimized management of emergency surgical service through economic assessment. The 2-nd edition of the International Exhibition of Innovation and Tehnology Transfer Excellent IDEA. 19-21 September, 2023, Chișinău, Republic of Moldova.

- ✓ **National**

33. **Malacinschi-Codreanu T., Dolghii A.** Aplicabilitatea laparoscopiei în urgențe abdominale în IMSP IMU. Al XIII-lea Congres al Asociației Chirurgilor „Nicolae Anestiadi” și al III-lea Congres al Societății de Endoscopie, Chirurgie miniminvasivă și Ultrasonografie „V. M. Guțu” din Republica Moldova (cu participare internațională). 18-20 septembrie, 2019. Chișinău, Republica Moldova.
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Disponibil la: https://ibn.idsi.md/ru/vizualizare_articol/125711
36. **Malacinschi-Codreanu T., Ciupac M., Al Asam N.** Evaluarea pacientului cu abdomen acut în departamentul de medicină de urgență. Conferința științifică

anuală USMF Nicolae Testemițanu: „Cercetarea în biomedicină și sănătate: calitate, excelență și performanță”. 20-22 octombrie, 2021. Chișinău.

37. **Malacinschi-Codreanu T.** Abordarea laparoscopică a abdomenului acut în IMSP Institutul de Medicină Urgentă. Conferința științifică anuală USMF Nicolae Testemițanu: „Cercetarea în biomedicină și sănătate: calitate, excelență și performanță”. 19-21 octombrie 2022. Chișinău.

ADNOTARE

Malacinschi – Codreanu Tatiana „Implementarea metodelor laparoscopice în asigurarea calității serviciului chirurgical de urgență”. Teză de doctor în științe medicale, Chișinău, 2023.

Structura tezei. Teza este expusă pe 109 pagini de text de bază: introducere, 4 capitole, concluzii generale și recomandări practice, 34 tabele și 64 figuri. Bibliografia include 99 surse. Rezultatele principale ale studiului au fost publicate în 21 lucrări științifice.

Cuvinte-cheie: abdomen acut, analiză, chirurgie, cost, eficacitate, eficiență, intervenție, laparoscopie, sănătate, sistem.

Scopul lucrării. Evaluarea clinică și economică a cazurilor de abdomen acut tratate/diagnosticate prin metode clasice și laparoscopice pentru optimizarea calității tratamentului în urgențele abdominale.

Obiectivele cercetării. Evaluarea clinică a metodelor curativ diagnostice laparoscopice în serviciul chirurgical de urgență. Aprecierea calității tratamentului abdomenului acut în serviciul chirurgical de urgență. Evaluarea economică a metodelor curativ diagnostice laparoscopice în serviciul chirurgical de urgență. Evaluarea cost-eficacității intervențiilor chirurgicale minim invazive și a celor clasice. Elaborarea recomandărilor pentru optimizarea tratamentului abdomenului acut în cadrul serviciului chirurgical de urgență.

Noutatea și originalitatea științifică Pentru prima dată în Republica Moldova s-a efectuat evaluarea clinică și economică a cazurilor similare de abdomen acut, tratate chirurgical clasic/laparoscopic, compararea acestora și identificarea impactului în aprecierea multicriterială (clinică, economică, socială) a metodei chirurgicale de tratament mai eficace atât pentru beneficiarul, care necesită asistență medicală calificată pentru AA, cât și la nivel instituțional.

Problema științifică soluționată în teză. Rezultatele cercetării au contribuit la soluționarea unei probleme științifice importante prin fundamentarea din punct de vedere metodologic (analiza clinică și economică) a procesului de identificare a celor mai eficace metode de tratament chirurgical clasic/laparoscopic a stărilor similare de abdomen acut, fapt care a confirmat oportunitatea de a optimiza managementul urgențelor abdominale prin implementarea metodelor laparoscopice în asigurarea calității serviciului chirurgical de urgență.

Semnificația teoretică și valoarea aplicativă a lucrării. Studiul a permis demonstrarea necesității promovării instrumentelor de analiză cost-eficacitate a intervențiilor chirurgicale, contribuind la argumentarea implementării metodelor laparoscopice în tratamentul AA chirurgical, la creșterea calității serviciilor medicale prestate, micșorarea morbidității și mortalității populației prin patologii chirurgicale abdominale acute, asigurând o optimizare a organizării și funcționării sistemului de chirurgie minim invazivă în urgențele chirurgicale abdominale.

Implementarea rezultatelor științifice. Rezultatele obținute au fost implementate în activitatea IMSP IMU și argumentează necesitatea elaborării cadrului legal a unui *Program național de promovare a chirurgiei laparoscopice în Republica Moldova în cadrul serviciului chirurgical de urgență.*

РЕЗЮМЕ

Малачински-Кодряну Татьяна „Внедрение лапароскопических методов в обеспечении качества неотложной хирургической помощи”. Диссертация на соискание учёной степени кандидата медицинских наук, Кишинэу, 2023.

Структура диссертации. Основной текст диссертации изложен на 109 листах и включает: введение, 4 глав, выводы и практические рекомендации, 34 таблицы и 64 рисунка. Библиография включает 99 источников. По теме опубликовано 21 научных работ.

Ключевые слова: острый живот, анализ, хирургия, стоимость, эффективность, оперативность, вмешательство, лапароскопия, общественное здравоохранение, система.

Цель работы. Клинико-экономическая оценка случаев острого живота, потребовавших лечения классическими или лапароскопическими методами, с целью оптимизации качества лечения. **Задачи исследования.** Клиническая оценка лапароскопических методов лечения при абдоминальных хирургических неотложных состояниях. Оценка качества лечения острого живота в службе неотложной хирургии. Экономическая оценка лапароскопических методов в неотложной хирургической службе. Оценка экономической эффективности лапароскопических вмешательств и классических оперативных вмешательств при остром животе. Разработка рекомендаций по оптимизации лечения острого живота в неотложной хирургической службе.

Научная новизна и оригинальность оцениваются путем использования экономической оценки случаев лечения острого живота с целью сравнения и выявления влияния анализа „затраты-эффективность” на оценку наиболее эффективного метода лечения острого живота для пациента, а также с благоприятным экономическим эффектом для медицинских учреждений.

Научная задача решённая в диссертации. Результаты исследования способствовали решению важной задачи путем научно-методической аргументации процесса определения критериев качества лечения острого живота на основе клинико-экономических критериев, что способствовало разработке рекомендаций по оптимизации ведения абдоминальных неотложных состояний в службе неотложной хирургии Республики Молдова.

Теоретическая и практическая значимость. Исследование продемонстрировало необходимость внедрения инструментов анализа экономической эффективности оперативных вмешательств, что способствовало аргументации необходимости внедрения лапароскопии в лечении острого живота. Это обеспечит повышение качества оказываемых медицинских услуг, снижение заболеваемости и смертности населения от неотложных абдоминальных хирургических вмешательств, обеспечит оптимизацию организации и работы системы малоинвазивной хирургии.

Внедрение результатов исследования. Полученные результаты внедрены в деятельность Института Ургентной Медицины Республики Молдова. Результаты исследования доказывают необходимость разработки нормативно-правовой базы *Национальной Программы продвижения лапароскопической хирургии в Республике Молдова в рамках службы неотложной хирургии.*

ANNOTATION

Malacinschi-Codreanu Tatiana „Implementation of laparoscopic methods in the quality assurance of the emergency surgical service”. The thesis for the degree of Doctor of Medical Science, Chisinau, 2023.

Structure of the thesis. The thesis includes 109 pages of the main text: introduction, four chapters, general conclusions and practical recommendations, 34 tables and 64 figures. The bibliography includes 99 references. The principal results of the study were published in 21 scientific papers.

Key words: acute abdomen, analysis, surgery, cost, effectiveness, efficiency, intervention, laparoscopy, health, system.

The aim of study. Evaluation of similarly treated cases of acute abdomen based on clinical and economic analysis of diagnostic/curative laparoscopic methods to optimize the quality of treatment in abdominal emergencies.

Objectives of the study. Clinical evaluation of laparoscopic methods in the emergency surgical service. Assessing the quality of acute abdomen treatment in the emergency surgical service. Economic evaluation of laparoscopic methods in the emergency surgical service. Cost-effectiveness evaluation of minimally invasive and classic surgical interventions. Elaboration of recommendations for optimizing the treatment of acute abdomen in the emergency surgical service.

Scientific originality and novelty is appreciated by applying the economic evaluation of the cases treated for acute abdomen, comparing them and identifying the impact of the cost-effectiveness analysis in the multicriteria evaluation (clinical, economic, social) of the surgical treatment method. This analysis allowed the identification of the most welcome treatment both for the beneficiary, who requires qualified medical care for acute abdomen, and at the institutional level.

The scientific problem solved in the thesis. The results of the research contributed to the solution of an important scientific problem by substantiating from a methodological point of view (clinical and economic analysis) the process of identifying the most effective methods of classical/laparoscopic surgical treatment of similar conditions of acute abdomen, a fact that confirmed the opportunity to optimize the management of abdominal emergencies by implementing laparoscopic methods in ensuring the quality of the emergency surgical service.

Theoretical significance and applicative value. The present study demonstrated the need to promote tools for the cost-effectiveness analysis of surgical interventions, contributing to the argumentation of the implementation of laparoscopic methods in the treatment of acute abdomen. The subsequent effect was by ensuring the increase in the quality of the medical services provided, reducing the morbidity and mortality of the population through acute abdominal surgical pathologies, optimizing the organization and functioning of the minimally invasive surgery system.

Implementation of scientific results. The results of study were implemented in the clinical activity of the Research Institute in Emergency Medicine. The results of the study demonstrate the need to develop a legal framework for *the National Program for the Promotion of Laparoscopic Surgery in the Republic of Moldova within the Emergency Surgery Service*, which would facilitate the introduction of minimally invasive surgery.

MALACINSCHI-CODREANU TATIANA

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URGENȚĂ**

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QUALITY ASSURANCE OF THE EMERGENCY SURGICAL
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