Current Issues in Pharmacy and Medical Sciences
Formerly ANNALES UNIVERSITATIS MARIAE CURIE-SKLODOWSKA, SECTIO DDD, PHARMACIA

journal homepage: https://czasopisma.umlub.pl/curipms

The quality of rendering surgical aid in the context of implementation of reforms in healthcare and medical education in Ukraine

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ARTICLE INFO

Received 28 December 2022
Accepted 08 February 2023

Keywords:
quality of medical aid, surgical activity, postoperative mortality, reforming of medicine.

ABSTRACT

The aim of the study was to ascertain the current state of surgical care as resulting from the reformation of medicine and education in Ukraine and to recommend ways of advancing it. The research included the processing and analysis of the annual reports of the Urology department of the Municipal City Clinical Emergency Hospital in Lviv during 2010-2019. The main statistical indicators of rendering the surgical aid (surgical activity, the structure of surgical interventions, mortality and structure of mortality, which are used in quantitative assessment of quality of medical aid and submitted in the annual reports) were analyzed in this work.

The study has identified the main problems of surgical work of the healthcare facilities in the section of the Urology department of the Clinical Emergency Hospital in Lviv, the most important of which are the low indicator of surgical activity and the presence of postoperative mortality. The main mortality reasons of the patients of the Urology department of this hospital are neglected oncopathology or other concomitant pathology, multiple organ failure, septic condition.

The key points towards resolving these problems are the further development of the material-technical base of the hospital and improvement of the overall quality of medical staff training, both during the undergraduate and postgraduate training of specialists, which will allow the improvement of the quality of rendering medical aid nationwide.

INTRODUCTION

The key direction of the state policy of Ukraine regarding the conditions of medical reformation is the improvement and adaptation of a national health care system adjusted to modern requirements by means of enhancement of health care efficiency, which includes the proper and efficient use of material and staff resources [1-3].

The surgical service of Ukraine is considered to be one of the strongest and most representative, a so-called 'cornerstone' of the medical sphere and, accordingly, its development has been rapid: everything that seemed new yesterday and was performed only in narrow-profile highly specialized health care facilities (HCF) by single doctors-innovators, has become the usual daily work of specialists today [4].

In Ukraine the assessment of the quality of work of the surgical service is carried out in relation to a specific patient or a group of patients who are grouped by one disease or type of medical care (surgical) and the indicators that characterize it: surgical activity, postoperative mortality, the structure of surgical interventions and mortality according to diagnoses or other factors [1].

The field of surgery is constantly improving, as are other branches of medicine. Hence, it is important to reform medical education, which will take health-care in Ukraine to another quality level and bring it closer to the standards of the European Union [4-7]. The World Federation for Medical Education (WFME) considers that life-long

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learning is the first-priority professional duty of a doctor, as this will enhance his/her skills and improve the quality of medical care provision [8].

At present, within the medical reform in Ukraine, the health care facilities are becoming independent, thus the efficiency and quality research of functioning of the health-care facility is very important in the context of rendering the medical aid and detecting strong and weak sides of work of the health-care field (HCF).

The aim of the study was ascertain the current state of surgical care as resulting from the reformation of medicine and education in Ukraine.

MATERIALS AND METHODS

All annual reports of the Urology department of the Municipal city clinical emergency hospital (MCCEH) of Lviv for the period of 2010-2019 were included into the study. The data of the year 2020 were not included in the analysis because of the changes in the hospital work through the input of restrictive measures for the prevention of spread of the acute respiratory disease COVID-19, caused by the SARS-CoV-2 coronovirus.

The main statistical indicators of rendering surgical aid: surgical activity (the share of operated patients among all those hospitalized at the department), the structure of surgical interventions (the share of each type of surgery among all the surgeries), lethality (the share of the deceased among all those hospitalized at the department) and structure of lethality (the share of the deceased from a particular reason among all the deceased), which are used in quantitative assessment of quality of medical care and presented in annual reports, were analyzed in this work. All key indicators are given in tables or figures, and the most important are described in the text.

The statistical methods included the analysis of the average (the calculation of the mean arithmetic and quadratic deviation due to normal data distribution) and relative values (fractions – presented as proportions and confidence intervals (95% CI) obtained by Fisher's angular transformation method). Structural-and-logical analysis (selection of scientific data from chosen relevant information sources and phenomena, which are studied and analyzed according to a certain logic, their structuring) and system approach (establishment of structural and systemic relationships between variables or elements of the studied population) were used for the analysis of the obtained data [9, 10]. All statistical calculations were performed using Excel and RStudio *v.* 1.2.5042 software.

RESULTS

During the analyzed period of 2010-2019, on the basis of the Urology department of the MCCEH, 17129 patients were treated (on an average of 1712.9±156.4 patients per year). Of them, only about one third (37.4%; 36.7-38.1, n=6409) were operated upon due to a significant number of patients with diseases who were treated conservatively: pyelonephrites, benign hyperplasia of the prostate, urolithiasis – often with repeated hospitalizations during one year.

We believe that the prolonged occupation of medical patients rather than surgical patients in surgical hospital wards provokes two problems. Firstly, the additional extra costs related to maintenance costs for these categories of patients, and secondly, the shortfall of surgical care to needy patients, due to the absence of free beds. However, in multilateral hospitals, these questions are solved easily by transferring patients to the therapeutic departments.

Among all 6409 postoperative patients (on an average 640.9±62.3 persons per year), 6968 surgical interventions were performed (on an average 696.8±73.1 operations per year), that is equal to 109 operations per 100 operated patients.

If the dynamics of this indicator for 10 years is followed, then the important issue is that within the last years of observation, the average number of performed operations per 100 postoperative patients has decreased significantly, and in 2019, this indicator was equal to 106 operations/100 operated persons against 114 operations/100 operated persons in 2010. Such data indicates a decrease in the number of repeated operations and a direction towards increase efficiency of rendering surgical aid being followed. This includes the right choice of surgical intervention, the quality of the operation itself and concomitant of the drug treatment at all stages of rendering medical aid to surgical patients.

Assessment of the structure of the performed surgical interventions by nosological forms has shown that in all years of observation, the first three rating places among all reasons of surgical activity in the Urology department, were occupied by prostate adenoma (23.4%; 22.3-24.5, n=1335), malignant neoplasms (21.4%; 20.3-22.4, n=1219) and urolithiasis (11.2%; 10.5-12.1, n=644) (Figure 1).

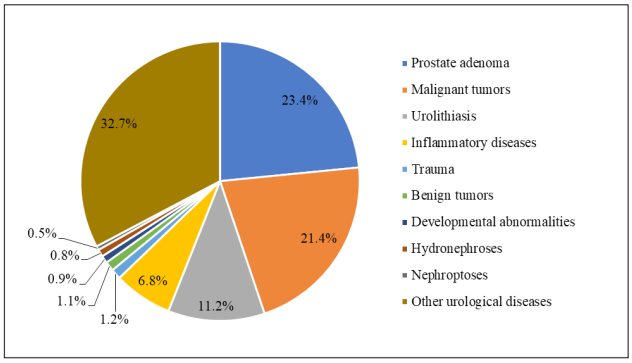

Figure 1. Structure of surgical interventions according to nosological forms at the Urology department of the MCCEH (%)

The surgical interventions for prostate adenoma among all the performed operations in the Urology department of the MCCEH, for the analyzed period, ranged from 21.6% (18.9-24.4) in 2012, to 25.5% (922.3-28.8) in 2017. It should be noted that there was a decrease in the number of the share of surgical interventions due to malignant neoplasms within the period of observation - from 26.1% (22.9-29.5) in 2010, to 19.5% (16.6-22.6) in 2017. This change is probably due to the result of the HC system undergoing reform at the level of the primary care (PC); PC doctors immediately refer such patients to the IHF (in particular, to the Lviv oncological regional medico-diagnostic centre where the Urology department has been functioning since 2004).

Analysis of the data regarding the number of operations for urolithiasis at the Urology department of the MCCEH reveals a tendency towards a decrease within the last years of observation – from 13.9% (11.5-16.5) among all performed operations in 2013, to 11.8% (9.5-14.3) in 2017, taking into account that the level of urolithiasis in Ukraine, including in the Lviv region remains within the consistently high indicators and there is no tendency to decrease.

This allows us to make two assumptions: firstly, the possible lowering of competitiveness of the MCCEH in comparison with other medical institutions, where the removal of kidney stones or other calculi is performed by using high-tech modern methods, and, secondly, the appearance of modern conservative methods of treatment which allow carrying-out treatment of this disease without surgical intervention; this explains the significant number of patients with urolithiasis who had stayed in the department of the hospital but have not been operated on.

Subsequently, we conducted an examination of the structure of surgical interventions by these three main nosological forms: prostate adenoma, malignant neoplasms, urolithiasis, as well as for other common reasons for operations, such as inflammatory diseases and trauma (Tables 1-3). In the structure of surgical interventions in the case of prostate adenoma (Table 1), transurethral resection of prostate (TUR of prostate) predominates. During 2010-2019, its share among the performed operations for prostate adenoma was within the limits of 48.4%-84.0%. It should be noted that for the analyzed period, a gradual upward trend of specific gravity of a given surgical intervention in case of prostate adenoma was observed – from 48.4% (40.6-56.3) in 2010, to 76.6% (69.8-82.8) in 2019.

Single-step adenomectomy in the structure of surgical interventions in case of prostate adenoma for the period of 2010-2019 was within the limits of 14.3%-34.6% during 2010–2019. Accordingly, the number of performed epicystostomies in the structure of surgical interventions for prostate adenoma decreased from 16.1% (10.8-22.3) in 2010, to 0.7% (0-2.6) in 2019. Vaso-ressection had also decreased from 6.5% (3.2-10.9) in 2010, to 1.9% (0.4-4.6) in 2019; as did 2nd stage of adenomectomy – from 4.5% (1.8-8.3) in 2010, to 0.7% (0-2.6) in 2019.

In the structure of surgical interventions for urological patient oncopathology, transurethral resection occupied a notable place. Most often it was carried out to resolve the effects of cholecystic tumor (Table 2). For the period of 2010-2017, the share of such operations increased by 2.5 times: from 16.2% (11.2-21.9) in 2010, to 41.0% (32.8-49.4) in 2017.

The second most common operation undertaken upon urooncological patients during 2010-2019 was castration (in prostate cancer treatment). Here, the number of operations undertaken grew from 18.4% (13.1-24.4) in 2010, to 37.5% (29.3-46.0) in 2019. Such increase in application of castration (more than 2 times) indicated growth in the number of neglected forms of prostate cancer with late appeal – and testified to the poor organization of medical aid in the case of this disease.

Transurethral resection of prostate in tumors was the third most common operation undertaken during the study's time period. This was equal to 21.8% (16.1-28.1) of all surgical interventions with regard to oncourological patients in 2010. Its share in the structure of surgical interventions had initially a tendency to decrease, with the minimum value

Table 1. Structure of surgical interventions in prostate adenoma at the Urology department of the MCCEH (%; 95% CI)

Types of operations	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
TUR of prostate	48.4 (40.6-56.3)	50.3 (42.8-57.8)	52.9 (45.7-60.0)	68.3 (61.4-74.8)	57.2 (49.5-64.8)	63.0 (55.0-70.6)	67.1 (59.6-74.2)	84 (78.2-89.0)	80.6 (74.1-86.3)	76.6 (69.8-82.8)
Single-step adenomectomy	24.5 (18.1-31.6)	27.2 (20.8-34.1)	25.7 (19.7-32.2)	21.0 (15.5-27.1)	34.6 (27.4-42.2)	27.4 (20.5-34.9)	22.8 (16.6-29.6)	14.3 (9.5-19.9)	16.9 (11.5-23.1)	20.1 (14.3-26.6)
Epicystotomy	16.1 (10.8-22.3)	16.6 (11.4-22.6)	13.9 (9.3-19.2)	5.9 (3.0-9.7)	7.6 (4.0-12.2)	8.9 (4.8-14.0)	5.0 (2.2-8.9)	0.6 (0-2.3)	1.3 (0.1-3.6)	0.7 (0-2.6)
Vasoresection	6.5 (3.2-10.9)	1.2 (0.1-3.4)	2.1 (0.5-4.6)	3.2 (1.2-6.2)	-	-	1.9 (0.4-4.6)	-	0.6 (0-2.4)	1.9 (0.4-4.6)
2nd stage of adenomectomy	4.5 (1.8-8.3)	4.7 (2.0-8.4)	5.4 (2.6-9.1)	1.6 (0.3-3.9)	0.6 (0-2.4)	0.7 (0-2.7)	3.2 (1.0-6.5)	1.1 (0.1-3.2)	0.6 (0-2.4)	0.7 (0-2.6)

Table 2. Structure of surgical interventions in oncourological patients at the Urology department of the MCCEH (%; 95% CI)

Types of operations	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
TUR of prostate in case of tumors	21.8 (16.1-28.1)	6.8 (3.6-11.0)	10.0 (6.0-14.9)	3.5 (1.1-7.1)	6.5 (3.2-10.9)	8.8 (4.6-14.1)	8.7 (4.4-14.2)	17.2 (11.3-24.0)	19.0 (12.7-26.3)	21.9 (15.2-29.4)
Castration in prostate cancer	18.4 (13.1-24.4)	21.6 (15.9-28.0)	27.1 (20.7-34.0)	22.4 (16.0-29.6)	21.4 (15.3-28.2)	27.2 (20.1-35.0)	27.6 (20.2-35.7)	16.4 (10.6-23.1)	35.7 (27.6-44.2)	37.5 (29.3-46.0)
TUR of cholecystic tumors	16.2 (11.2-21.9)	35.2 (28.3-42.4)	30.6 (23.9-37.7)	43.4 (35.4-51.6)	38.3 (30.8-46.1)	39.0 (31.0-47.3)	37.8 (29.6-46.4)	41.0 (32.8-49.4)	*	*
Nephrectomy	12.8 (8.3-18.1)	11.9 (7.5-17.1)	10.0 (6.0-14.9)	9.8 (5.5-15.2)	14.3 (9.2-20.3)	9.6 (5.2-15.1)	9.4 (5.0-15.1)	9.7 (5.3-15.3)	10.7 (6.0-16.6)	14.1 (8.6-20.6)
Electrocoagulation	12.8 (8.3-18.1)	0.6 (0-2.3)	0.6 (0-2.3)	1.4 (0.1-4.0)	-	-	-	-	-	1.6 (0.2-4.5)
Hemicastration in testicular cancer	6.1 (3.1-10.1)	10.2 (6.2-15.1)	6.5 (3.3-10.7)	2.1 (0.4-5.1)	7.1 (3.6-11.7)	5.1 (2.1-9.4)	3.9 (1.2-7.9)	6.0 (2.6-10.6)	9.5 (5.0-15.2)	9.4 (5.0-15.0)
Prostatectomy in prostate cancer	4.5 (2.0-8.0)	2.8 (0.9-5.7)	4.7 (2.0-8.4)	4.2 (1.5-8.1)	2.6 (0.7-5.7)	1.5 (0.2-4.2)	1.6 (0.2-4.5)	2.2 (0.4-5.4)	14.3 (8.8-20.9)	3.1 (0.8-6.8)
Epicystostomy in tumors	3.9 (1.6-7.2)	6.8 (3.6-11.0)	6.5 (3.3-10.7)	3.5 (1.1-7.1)	4.5 (1.8-8.3)	2.9 (0.8-6.4)	1.6 (0.2-4.5)	1.5 (0.1-4.2)	2.4 (0.5-5.8)	-
Resection of the wall of the urinary bladder with tumor	1.7 (0.3-4.1)	2.8 (0.9-5.7)	2.9 (0.9-5.9)	5.6 (2.4-9.9)	2.6 (0.7-5.7)	3.7 (1.2-7.5)	4.7 (1.7-9.0)	0.7 (0-2.8)	6.0 (2.5-11.0)	9.4 (5.0-15.0)
Hemicystectomy	1.1 (0.1-3.1)	-	-	-	-	-	-	-	-	-
Cystectomy	0.6 (0-2.3)	0.6 (0-2.3)	-	0.7 (0-2.7)	0.6 (0-2.4)	0.7 (0-2.8)	0.8 (0-3.1)	0.7 (0-2.8)	-	-
Renal hemiresection	-	0.6 (0-2.3)	1.2 (0.1-3.4)	2.8 (0.7-6.1)	1.3 (0.1-3.7)	0.7 (0-2.8)	3.9 (1.2-7.9)	4.5 (1.7-8.6)	2.4 (0.5-5.8)	3.1 (0.8-6.8)
Ureteroanastomosis in tumors	-	-	-	0.7 (0-2.7)	0.6 (0-2.4)	0.7 (0-2.8)	-	-	-	-

Note * – Data in the report are not analyzed

amounting to 3.5% (1.1-7.1) in 2013, while within the subsequent 6 years, this figure increased gradually, and in 2019, reached the level of 2010 – 21.9% (15.2-29.4).

Nephrectomy interventions of oncourological patients occupied 9.4%-14.3% of all surgical interventions during the study period. Other types of surgical interventions in oncopathology at the Urology department were conducted much less frequently, in comparison with the above-mentioned. Worth noting is a significant increase in two more traumatic complex operations: hemicastration in case of cancer of the testicle (which increased 1.5 times: from 6.1% (3.1-10.1) in 2010, to 9.4%; 5.0-15.0 in 2019) and resection of the wall of the urinary bladder due to tumor (which increased 5.5 times: from 1.7% (0.3-4.1) in 2010, to 9.4% (5.0-15.0) in 2019). Such effect indicates imperfect monitoring of oncopathologies, and as a result – the need to treat severe, advanced forms of these diseases.

In studying the performed nephrectomies at the Urology department of the MCCEH during 2010-2019, we established that within 2010-2019, nephrectomies were performed due to detection of the presence of tumors (Table 3). Their level was consistently high for all 10 years, with a slight decrease in the last three years of observation – from 65.0% (43.3-83.8) in 2017, to 52.9% (36.3-69.2) in 2019. Thus, oncopathology remained the root cause for kidney removal.

With regard to hydronephrosis, the share of such operations for the analyzed period was within the limits of 6.7%-19.2% of all performed nephectomies. Notably, in 2019, it reached a record figure of 41.2% (25.5-57.9) – a sixfold increase, when compared with the previous figure from 2018 (6.7%; 0-24.2). Hydronephrosis comes about as a result of neglected pathology. In the majority of cases, as a rule, it is treated by insertion of a nephrostome tube, instead of kidney removal. For this reason, such a significant growth of nephrectomies within the last year needs additional analysis.

A similar situation is also observed in case of urolithiasis – a fourfold increase of nephrectomies within the last year of observation: 20.0% (4.4-43.2) in 2018 against 5.0% (0-18.5) in 2017. These figures indicate that this organ saving operation was applied for this disease in the majority of cases. According to the obtained data, nephrectomies in purulent processes amounted to 3.1%-19.2%; in kidney trauma – 3%-6.7%; in secondary contracted kidney – 5.9%-10.0%. The presence of severe, advanced forms of the disease contributed to the emergence of postoperative complications, which in its turn led to an increase in the postoperative mortality level of urological patients.

The average mortality level of urological patients who underwent the course of treatment in the MCCEH and were under a 10-year supervision, was equal to 0.25% (0.18-0.33) of all the deceased among all those who were treated, with fluctuations in the figure from 0.06% (0-0.22) in 2010 and 2013, to 0.65% (0.31-1.11) in 2015, followed by annual reductions to the level of 0.13% [0.01-0.38) in 2019. Altogether, 43 mortality cases were registered at the Urology department of the hospital in the 10 year study period, with the most common reason being neglected oncopathology leading to multiple organ failure (Figure 2). Indeed, the performed analysis of causes of death by years (Table 4) reveals that the root causes of mortality of all urological patients in the MCCEH in all years of observation was neglected oncopathology and multiple organ failure.

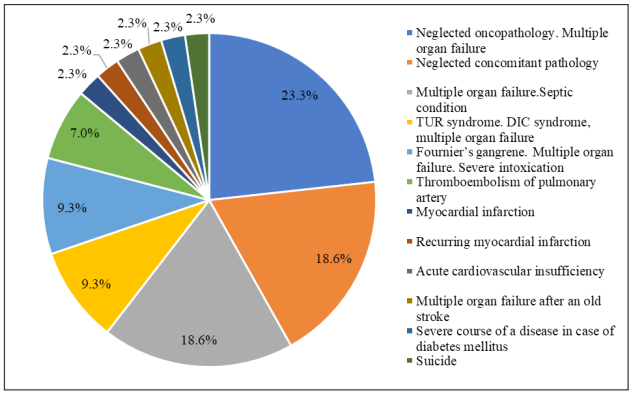

Figure 2. Structure of causes of death at the Urology department of the MCCEH during 2010-2019

Within the last years of observation, there were also fatal cases due to severe intoxication, TUR syndrome, DIC syndrome and Fournier's gangrene. Neglected concomitant pathology, septic condition, thromboembolia of pulmonary artery were also evidenced, albeit during different years. In the first years of the study period (2011-2013), single cases of death due to the concomitant non-urological pathologies were observed, most of which were cardiovascular, such as recurring myocardial infarction, acute cardiovascular insufficiency, as well as multiple organ failure after an old stroke and a severe course of a disease in case of the diabetes mellitus. The aforementioned pathologies as a cause of death, were missing in the more recent years of research, indicating an increase in efficiency and timely rendering of medical aid in case of occurrence of these diseases – one of the levers of which being a highly qualified medical staff.

Table 3. The structure of performed nephrectomies in inflammatory diseases traumas and other pathologies at the Urology department of the MCCEH (%; 95% CI)

The reasons for operations	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
In case of tumors	69.7 (53.2-83.9)	61.8 (45.1-77.2)	51.5 (34.7-68.1)	58.3 (38.4-76.8)	68.7 (51.8-83.3)	50.1 (31.3-68.8)	57.1 (35.9-77.0)	65.0 (43.3-83.8)	60.0 (35.0-82.5)	52.9 (36.3-69.2)
In purulent processes	15.1 (5.1-29.1)	17.6 (6.9-32.0)	12.1 (3.4-25.2)	12.5 (2.6-28.3)	3.1 (0.0-11.8)	19.2 (6.7-36.2)	14.3 (3.0-32.0)	5.0 (0.0-18.5)	-	-
In case of hydronephrosis	9.1 (1.8-21.1)	8.8 (1.8-20.5)	15.2 (5.2-29.2)	12.5 (2.6-28.3)	15.6 (5.3-30)	19.2 (6.7-36.2)	19,0 (5.5-38.1)	15.0 (3.2-33.5)	6.7 (0.0-24.2)	41.2 (25.5-57.9)
In urolithiasis	6.1 (0.6-16.6)	5.9 (0.6-16.1)	18.2 (7.1-32.9)	16.7 (4.8-33.9)	6.3 (0.6-17.1)	11.5 (2.3-26.3)	4.8 (0.0-17.7)	5.0 (0-18.5)	20.0 (4.4-43.2)	-
In kidney trauma	-	5.9 (0.6-16.1)	3.0 (0.0-11.4)	-	6.3 (0.6-17.1)	-	4.8 (0.0-17.7)	-	6.7 (0.0-24.2)	-
In secondary contracted kidney	-	-	-	-	-	-	-	10.0 (1.0-26.5)	6.6 (0.0-24.1)	5.9 (0.6-16.1)

Table 4. Causes of death of urological patients in the MCCEH during 2010-2019 (abs. data)

Causes	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Neglected oncopathology. Multiple organ failure	1	1	1	1	1	1	1	1	1	1
Neglected concomitant pathology		1	1		2	3	1			
Multiple organ failure. Septic condition					2	2	1	1	1	1
TUR syndrome. DIC syndrome, multiple organ failure						1	1	1	1	
Fournier's gangrene. Multiple organ failure. Severe intoxication						1	1	1	1	
Thromboembolism of pulmonary artery		1			2					
Myocardial infarction						1				
Recurring myocardial infarction			1							
Acute cardiovascular insufficiency			1							
Multiple organ failure after an old stroke			1							
Severe course of a disease in case of diabetes mellitus		1								
Suicide						1				

DISCUSSION

Thus, among all methods of surgical interventions in case of prostate adenoma, only the share of transurethral resection of prostate had significantly increased during the time period under study. This form of operation is the "gold" standard due to its high efficiency, accuracy and the minimal trauma of the surrounding tissues, and is performed without external incisions and suturing [11].

The application of nephrectomies requires an additional study by means of consideration of each case separately (by method of surveying of patients and doctors). It is hoped that such investigation will enable the development of measures to prevent such urgent situations.

Professor O. Usenko [4] holds the opinion that the high indicators of postoperative mortality are due to several reasons. First of all, the complexity of clinical cases and severe course of the main disease. The cause of this, he believes, is the late appeal of patients for medical aid and self-treatment (these data are practically not displayed in the official statistical reporting).

Other reasons are "insufficient qualification of medical specialists, neglect of self-improvement, use of outdated methods of diagnostics and treatment". The reform in the medical sphere is designed to eliminate these gaps in Ukraine's medical practices. After all, the more modern the equipment and the more trained the doctors are, the more conditions are there for applying the latest and more effective methods of treatment. Such action leads to economic savings and enhanced professionalism, which will promote the influx of patients, and provide thereafter more funding [2,12,13].

The ongoing reform also includes the training of highly specialized specialists, the professional level of which would prevent difficult situations or allow resolving them as quickly as possible. In fact, this once again proves the importance of continuous professional development of doctors – an activity that is being implemented today, as one of the reforming elements of Ukraine's medical education [5,14].

Therefore, the reform of higher undergraduate medical education will help to train creative and competitive specialists, the professional qualities of whom will comply with the labor market. Moreover, the implementation of modern international standards with regard to the postgraduate training of doctors will help to maintain and raise the level of professional skills and competence, thereby improving the quality of medical services.

CONCLUSIONS

Our analysis has made it possible to determine the main problems in the current surgical practices in the Urology department of the MCCEH in Lviv. The most important of these is the low indicator of surgical activity regarding urological patients in the MCCEH and postoperative mortality. Indeed, neglected oncopathology or other concomitant pathology, multiple organ failure and septic conditions are the main reasons for mortality at the Urology department of the MCCEH.

The key issues towards overcoming these problems include further development of the material-technical base of the hospital and improvement of the overall quality of healthcare staff training, both during the undergraduate and postgraduate training of specialists, which will allow to enhance the quality of rendered medical aid nationwide.

AUTHORS' STATEMENT

The authors declare no conflict of interest

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