



Research Article

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Hospital mortality in the surgical service of University Clinics of Lubumbashi in the Democratic Republic of the Congo: retrospective study over 6 months

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Abstract

Introduction: The study of mortality in a community permits to define the axes of disease prevention and readjust health policies. In a hospital department, such a study allows monitoring and revision of therapeutic measures; these are likely to deteriorate in their implementation over the years, which requires periodic criticism. The aim of our work was to record the frequency of deaths in the surgical department of the university clinic of Lubumbashi, to specify the characteristics of the deceased population as well as the main causes of death. **Patients and method:** This is a descriptive cross-sectional study with retrospective data collection, examining mortality in the surgical department of the university clinic of Lubumbashi over a six-month period, from January 15, 2020 to July 15, 2020. The data were collected from the hospitalization registers and files of patients in intensive care and from the operating protocol registers, grouped together on a three-fold sheet: epidemiological-clinical, therapeutic and progressive and processed in Word and Excel. We excluded from the study patients whose death was noted on admission to the emergency room. **Results:** The mortality rate was 18.8%, the mean age was 49.21 ± 21.87 (Extremes: 2-93 years) and the sex ratio M / F 5.14. Emergency was the most common mode of admission in 65.12% of cases (n = 28). 51.16% of death cases (n = 22) occurred postoperatively, while in 41.86% of cases (n = 18) patients had died without being operated. There were no reported comorbidities in 74.42% of the deaths (n = 32), and diabetes mellitus was the most common comorbidity in 16.28% of the cases (n = 7). 80% of the deaths were classified ASA III (n = 20). The initial cause of death was more abdominal and digestive pathologies (emergencies) in 39.53% (n = 17) of the whole series. In our study, patients who had had surgery before death accounted for 58.14% of cases, and 40% of them had been operated on at least once. The abdominal and digestive operations were more reoperated than the others with 9/10 cases, or 90% of re-intervention. The mean operating time was 6.54 ± 3.41 (Extreme: 0 and 9 days), and the mean hospital stay was 8.4 ± 14.5 (Extreme: 0 and 61 days). **Conclusion:** Our work has shown that the mortality rate found at 18.8% remains high given the university status of our establishment where the patients treated are often carriers of serious pathologies and where the interveners are varied. This forces us to question ourselves, not to make ourselves feel guilty but to draw the attention of general surgery nursing staff to our shortcomings, and to correct them.

Keywords: Mortality, Causes of death, Surgery.

INTRODUCTION

Addressing the problem of mortality in general surgery amounts to calling into question many parameters. Today in medical or surgical practice, one can only rely on objectivity and evidence. So we have entered the era of "evidence-based medicine" which enshrines facts and opinions. The challenge is tough, they force us to change our attitudes, our mentalities and to roll up our sleeves. To describe the state of health of a population, information of different kinds can be used: mortality, morbidity, prevalence of risk factors [1]. Studies of mortality in some developed countries are used to assess not only professional practices but also hospital performance. Today, medicine, and more specifically surgery, has clearly entered the era of assessment. It has indeed become essential to know really and as objectively as possible the results of our daily surgical activities. Surgeons must therefore, with the most rigorous approach possible, analyze their techniques themselves [2]. In developing countries, mortality statistics are incomplete and often unreliable. The study of mortality in a community makes it possible to define the axes of disease prevention and readjust health policies. In a hospital department, such a study allows monitoring and revision of therapeutic measures; these are likely to deteriorate in their implementation over the years, which requires periodic criticism. The surgical department of the university clinics of Lubumbashi has been

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operating for a long time without a medical audit, a system in use in several other hospitals in the country bringing together all the staff each week to discuss cases of death, pathologies of interest, and cases of patients presenting with a healing problem [2].

This study constitutes a means of reference for practices within the framework of evidence-based medicine. It will allow us to make an impersonal criticism which will allow us to correct certain practices assessed according to their relevance, in order to propose recommendations in the practice of better quality care.

PATIENTS AND METHOD

This is a descriptive cross-sectional study with retrospective data collection, on mortality in the surgical department of the university clinics of Lubumbashi over a period of six months, from January 15, 2020 to July 15, 2020. We opted for an audit Targeted Clinic, which is a first-line practice evaluation method, which allows, using a limited number of criteria, to compare practices with accepted references, with a view to improving them.

It is a general surgery department operating on three pavilions with a total of 58 beds including:

- a sector of 28 beds in pavilion II,
- a sector of 24 beds in pavilion III,
- a sector of 6 beds in pavilion IV,

A medico-surgical resuscitation unit to improve care for patients with major operations and surgical emergencies.

The service staff is made up of:

- Nineteen specialists including eight professors
- Seventeen senior assistants among which eight finalists
- Thirteen junior assistants
- Nineteen nurses including nine from the operating theater.

It has within it an operating theater with two main operating theaters to which are attached two spaces for dressing wounds. The initial diagnosis was the one made by the medical team who took care of the patient, and was confirmed by check-ups (imaging, etc.), or during surgery. The pathologies which have progressed towards the death of patients have been grouped into abdominal and digestive pathologies, neurosurgical, oncological, stomatological, metabolic and endocrine pathologies, and infectious pathologies of the limbs. The data were collected from hospitalization registers and patient files in intensive care and from the operating protocol registers, grouped together on a three-fold sheet: epidemiological-clinical, therapeutic and progressive and processed in Word and Excel. The pathologies which have progressed towards the death of patients have been grouped into abdominal and digestive pathologies, neurosurgical, oncological, stomatological, metabolic and endocrine pathologies, and infectious pathologies of the limbs. We excluded from the study patients who had only had time to notice death in the emergency room.

RESULTS

The frequency of death was 43 patients out of 229 admissions, that is to say a rate of 18.8% versus 81.22% favorable outcome.

The mean age of deceased patients was 49.21 ± 21.87 (Extreme: 2-93 years), with a large proportion in those over 45 years, or 62.79% of cases. The male sex was predominantly represented in 87.72% of cases, i.e. an M / F sex ratio of 5.14. The majority of deaths were recorded in the first trimester of the year with 55.81% of cases and a notably high frequency in January with 30.23% of all deaths. The

average monthly death was estimated at 7.17 per month. Emergency was the most frequent mode of admission in 65.12% of cases and the majority of deaths occurred postoperatively, i.e. 51.16% of cases (n = 22), while in 41.86 % of cases (n = 18) patients died without being operated on (Table 1).

Table 1: Distribution of deaths by admission method and period of death.

Mode d'admission	Effective(n)	Percentage (%)
Admitted in emergency	28	65,12
Admitted on an outpatient basis	15	34,88
Total	43	100
Period of death	Effective(n)	Percentage (%)
Postoperative	18	41,86
Intraoperative	3	6,98
Postoperative	22	51,16
Total	43	100

74.42% of the deaths had no declared comorbidities, and diabetes mellitus was the most common comorbidity in 16.28% of the cases. It also emerges that, 80% of deaths are classified ASA III before the operation against 20% of ASA IV cases. All the deceased were operated on under general anesthesia using ketamine combined with propofol, but in 76% of cases they were intubated. (Table 2)

Table 2: Distribution of deaths according to Comorbidity, ASA Class, type of anesthesia

Comorbidity	Effective (n)	Percentage (%)
Presence	11	25.58
Smoking	1	2.33
Diabetes	7	16.28
HIV+	2	4.65
Heart disease	1	2.33
Any	32	74.42
Total	43	100
ASA Class	Effective (n)	Percentage (%)
ASA IV	05	20
ASA III	20	80
Total	25	100
Type of anesthesia	Effective (n)	Percentage (%)
Ketamine + propofol with orotracheal intubation	19	76
Ketamine + propofol without orotracheal intubation	6	24
Total	25	100

Abdominal and digestive pathologies (emergencies) were more represented with 17 cases, or 39.53% of the whole series. Of these abdominal and digestive pathologies, AFP on perforation of hollow organs was at the top of the bill with 23.26% of cases, followed by post-ballistic hemoperitons with 5 cases, or 11.63% of cases. Neurosurgical pathologies, mainly post-accident TCE on the public highway, occupied second position with 10 cases (23.26%), thus ahead of oncological, metabolic and endocrine, infectious and stomatological pathologies with respectively 7 cases (16.28%), 5 cases (11.63%), 3 cases (6.98%) and 1 case (2.33%) (Table 3)

Table 3: Distribution of deaths by type of pathology and initial diagnosis (Initial causes of death).

Pathologies and initial diagnosis	Effectif (n)	Pourcentage (%)
Abdominal and digestive:	17	39.53
- Acute generalized peritonitis on perforation of a hollow organ:	10	23.26
- Ileal perforation	5	11.63
- Colonic perforation	2	4.65
- Gastric perforation	2	4.65
- Subphrenic abscess	1	2.33
- Bowel obstruction (volvulus on megacolon)	1	2.33
- Post ballistic hemoperitoneum	5	1.63
-Bowel rupture, renal artery, duodenal wound	3	6.98
- Splenic rupture, hepatic injury, gastric perforation	2	4.65
- Eventration on herteau abscess	1	2.33
Neurosurgical / Polytrauma post road traffic accident:	10	23.26
- Severe Cranio-encephalic trauma may or may not be associated with fractures		
Oncological:	7	16.28
- Colon Cancer	1	2.33
- Laryngeal cancer	1	2.33
- Prostate cancer	3	6.98
- Gastric cancer	2	4.65
Stomatologic: Perimandibular phlegmon	1	2.33
Metabolic and endocrine:	5	11.63
- Wet gangrenia on diabetic foot	4	9.30
- Distal obliterating arteriopathy (popliteal thrombosis)	1	2.33
Infectious (lower limbs):	3	6.98
- Suppurative thigh myositis	1	2.33
- Thigh phlegmon	1	2.33
- Tropical phagedenic ulcer	1	2.33

It follows from this table that the majority of patients who died after 20/25 operation, or 80%, underwent a laparotomy which in the course of time ended in morbidity. Of all these morbidities, sepsis, digestive

fistulas, and surgical site infection, most characterized the postoperative consequences (direct causes of death). (Table 4)

Table 4: Distribution of deaths according to type of intervention and postoperative morbidity

Type of intervention	Postoperative morbidity	Effective(n)	Percentage(%)
Laparotomy:		20	80
- Digestive suture	Fistulas, ionic disorder, surgical site infection	8	32
- Digestive ostomies	Sepsis, dehydration	4	16
-	Death on operating	2	8
- Drainage of pus + washing of the cavity	Surgical site infection	1	4
- Bowel resection + ATT	Fistulas, sepsis	3	12
- Nephrectomy	Hemorrhagic shock	1	4
- Cure of eventration	sepsis	1	4
Laryngectomy	Respiratory distress	1	4
Incision-drainage	Sepsis	2	8
Stripping wide	Sepsis	3	12
Amputation	Heart failure	1	4

Among the patients who had undergone surgery before death, 10, or 40% of cases, were re-operated at least once. And the abdominal and digestive operations were more reoperated than the others with 9/10 cases, or 90% re-intervention. (Table 5)

The mean operating time was 6.54 ± 3.41 (Extreme: 0 and 9 days), with a large proportion between 1 and 2 days in 56% of cases. The mean hospital stay was 8.4 ± 14.5 (Extreme: 0 and 61 days), and the majority of deceased patients had a hospital stay of between 0 and 5 days in 68% of cases.

DISCUSSION

To date, there have been no studies of mortality in our surgical department. In addition, the analysis of crude death rates within an establishment or service in no way reflects the quality of care provided or the effectiveness of the medical team. In fact, these rates do not take into account the characteristics of the population or the care structure and the means available to it. As a result, the use of the crude death rate as a comparison criterion between two services or two care establishments remains unreliable. Some authors have proposed adapted scores which take into account the characteristics of the population studied but also the pathologies and therapies used [1].

During the period of our study, which was 6 months, 229 patients were hospitalized in the surgical department of the CUL. The service recorded 43 cases of death, representing a mortality rate of 18.8%, occurring in subjects with a mean age of 49.21 ± 21.87 (Extreme: 2-93 years). The male sex was predominantly represented in 87.72% of cases, i.e. an M / F sex ratio of 5.14. In their study BROWSE *et al.* [7] found a mortality rate of 1.3% in general surgery compared to 6.2% in vascular surgery. For TAKONGMO S. *et al.* [8], in their study done in Cameroon in Yaoundé, the mortality rate was 3.14%, the average age was 43 years with a male predominance at 62%, or a sex ratio M / F of 1, 63. In 1988 Solovei *et al.* reported a mortality rate of 3% and specified that 70% of deceased patients were 70 years old and over [9]. In the series by KEMER Fatima *et al.* [1], the mortality rate was 1%, with an increase in the number of deaths in subjects over 50 years of age, ie 80% of cases, and an M / F sex ratio of 1.41. In another study carried out at the Rennes University Hospital in a general surgery department in 2003 shows a mortality rate of 2.9%. This rate is 6.5% when considering patients over 70 years old [10]. A similar study was carried out in Guinea by DOUMBOUYA N. *et al.* [11], but in a pediatric population had found a mortality of 11.61% over one year. In Europe, PROYEC *et al.* [12] found an average age of 63 years.

Our mortality rate turns out to be high compared to these authors [1, 8, 9, 12] although we found it statistically difficult to make a comparison given the differences in sample, methodology and period of studies between their studies and ours. However, the high frequency of death in males over 45 years found in our study is confirmed both by African authors [1, 8, 9], and by European authors [12].

Analysis of the literature data on mortality rates remains difficult, since each study has its own inclusion and exclusion criteria. The majority of studies reflect a local situation, specific to the clinical and surgical specificities of each establishment. In addition, there is no precise and unambiguous definition of postoperative mortality. Some only count the early deaths occurring during the first 30 postoperative days, others consider all deaths regardless of the delay in hospitalization. The role of age as an anesthetic risk factor is underlined in many literature, and a correlation appears between the total frequency of perioperative cardiac accidents and a high age, over 60 years. But for BAYON [13] and MANTION G. [12], the relationship between cardiac arrest linked to anesthesia with advanced age is more difficult to assert because it is often associated as a confounding factor with a high ASA score, itself a factor risk of cardiac arrest and do not retain the elderly as a risk factor.

Regarding periodicity, the average monthly death for our study was estimated at 7.17 per month, and the majority of deaths were recorded in the first quarter of the year with 55.81% of cases. The month of January having recorded more deaths or 30.23% of all deaths. The deceased patients were received in emergency in 65.12% of cases and the majority of deaths occurred postoperatively, i.e. 51.16% of cases (n = 22), while in 41.86% of cases (n = 18) the patients had died without being operated. The group of non-operated patients was made up exclusively of severe TCE who, due to a lack of CT scan results and treatment costs, remained in the intensive care unit until their death.

In our series, 74.42% of the cases of death had no declared comorbidities and diabetes mellitus was the most common comorbidity in 16.28% of the cases. It also emerges that, 80% of deaths were classified ASA III before the operation against 20% of ASA IV cases. All the deceased were operated on under general anesthesia using ketamine combined with propofol, but in 76% of cases they were intubated.

A study of 102,468 anesthesia shows that the risk of mortality increases with the ASA class: 0.003% for ASA 1 patients; 0.02% for ASA 2; 0.1% for ASA 3 and 0.3% for ASA4 [1]. The increase in the rate of this accident in ASA 3 and 4 patients was due to an increase in cardiac arrests partially linked to anesthesia, the risk linked to human error being dramatic here [15].

The results of our study show that abdominal and digestive pathologies (emergencies) were the initial cause of death with 17 cases, or 39.53% of the entire series. Of these abdominal and digestive pathologies, AFP on perforation of hollow organs was at the top of the bill with 23.26% of cases, followed by post-ballistic hemoperitons with 5 cases, or 11.63% of cases. In the series by TAKONGMO S. *et al.* [8], the distribution of causes of death according to the international classification of diseases showed that cancerous diseases were the most frequent cause with 76 deaths out of a total of 208, or 36.5%. For TOUIL MOHAMMED A. [16], the pathology with the highest mortality rate remains inflammatory (60%) then neoplastic (40%). Neurosurgical pathologies, mainly post-accident TCE on the public highway, occupied second position with 10 cases (23.26%), thus ahead of oncological, metabolic and endocrine, infectious and stomatological pathologies with respectively 7 cases (16.28%), 5 cases (11.63%), 3 cases (6.98%) and 1 case (2.33%). Comparing our results with those of other authors was difficult; the predominance of this or that other pathology in hospital mortality varying with the type of patients recruited in a service, the urgent or non-urgent type of surgery, the age and condition of the patients making it possible to classify them according to the criteria of the American Society of Anesthesiology.

In our series, the majority of patients who died after surgery, ie 72% (n = 18), underwent a laparotomy which over time resulted in morbidity. Of all these morbidities, sepsis, digestive fistulas, and surgical site infection, were more characteristic of the postoperative course and thus constituted direct causes of death in our patients. In the series by Touil Mohammed A. [16], the most frequent direct cause of death was septic shock with 82/105 cases, ie 78% of cases, and in the majority of cases starting from the digestive system. BRANGER B. *et al.* [10] had also identified in their study, sepsis as the main cause of death. A study carried out by BADR SERJI [17] in the visceral surgery department (A) at the IBN SINA CHU in RABAT in 2010 cites sepsis as the main cause of death.

All these results raise the thorny question of the management of surgical site and / or nosocomial infection in our establishments.

Despite the advances made in the surgical field (development of techniques, improvement in the understanding of the pathogenesis of infections and optimization of antibiotic prophylaxis (ABP)), surgical site infections (SSI) continue to be the most frequent complications in surgical settings with rates ranging from 5% to 30% [18].

In our study, patients who had undergone surgery before death accounted for 58.14% of cases, and 40% of them had been re-operated at least once. And the abdominal and digestive operations were more reoperated than the others with 9/10 cases, ie 90% re-operation. In the study by Catherine Saleh Ugumba *et al.* [19], covering 304 laparotomies, 56 patients or 18.42% had undergone at least one re-operation. Associated infections having been the main indication for re-operation in 55.36% of cases (n = 31), following which 12 reoperated patients died, i.e. a fatality rate of 17.65%.

In our series, most re-operations were done more by the on-call team and often in a climate of disagreement between the surgeon and the intensive care anesthetist.

We believe that re-surgery can only be lifesaving when its indication is well established in time and it is performed within a reasonable time after consultation with the resuscitator.

For our study, the mean operating time was 6.54 ± 3.41 (Extreme: 0 and 9 days), with the majority of cases between 1 and 2 days in 56% of cases. The mean hospital stay was 8.4 ± 14.5 (Extreme: 0 and 61 days), and the majority of deceased patients had a hospital stay of between 0 and 5 days in 68% of cases. For Sima Zue A. [20], delays in the management of emergencies were found for 176 patients (54.2%). In the series by Ngowe Ngowe M. *et al.* [21] the mean time to treatment was 72.7 hours. Our support period reflects a long delay observed in the care of our patients who, although admitted urgently, are subject to a rigorous administrative procedure which conditions their treatment by the payment of 2/3 of the bill.

CONCLUSION

Our work has shown that the mortality rate, found at 18.8%, remains high given the university status of our establishment where the patients treated are often carriers of serious pathologies and where the interveners are varied. Never mind, it forces us to question ourselves, it is not to make us feel guilty but it should allow us to draw the attention of general surgery nursing staff to our shortcomings, and correct them. The time taken to deal with surgical emergencies is unusually long. Socio-economic problems are most often the cause. The initial causes of death are inflammatory digestive pathologies and severe cranio-encephalic trauma. Septic shock as well as digestive fistulas have been found as the main direct causes of death. Such a study deserves to be repeated with more interest, provided it is prospective and based on the results of an objective discussion of the circumstances of each case of future death. The institution of a regular medical audit should be an imperative.

Author's Contributions

This work was carried out in collaboration between all authors.

Conflict of interest

The authors declare no conflict of interest.

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