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Original Investigation

Estimation of the capacity of emergency surgery in Konya: Nine-year multicenter study

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ABSTRACT

Objective: Although the number of surgical emergencies continues to increase, comprehensive data on emergency surgical admissions are scarce. The aim of this multicenter study was to evaluate the causes, management, and outcomes of the general surgical emergencies in the city of Konya, Turkey.

Material and Methods: The relevant details of the cases admitted and considered to be general surgical emergencies in Konya over a nine-year period (January 2003–January 2012) were analyzed. All demographic data were analyzed statistically.

Results: The study group comprised 21954 cases from 4 hospitals in Konya: 7154 from Konya Numune Hospital, 6,654 from Konya Education and Research Hospital, 6,400 from Necmettin Erbakan University Meram Medical Faculty, and 1,390 from Başkent University Konya Education and Research Hospital. Their mean age was 59.6 years, and the average hospitalization time was 3.3 days. The diagnoses of the admitted patients were as follows: acute appendicitis (59.57%), bowel obstruction (11.12%), trauma (7.97%), strangulated inguinal hernia (5.46%), acute cholecystitis (4.87%), peptic ulcer perforation (4.09%), mesenteric ischemia (2.73%), necrotizing fasciitis (2.73%), gastrointestinal system bleeding (1.79%), and others (1.1%).

Conclusion: The findings of the study indicate a steady increase in surgical admissions to emergency units. Nontraumatic acute abdomen was the most common reason for general surgical emergencies. Although the number of elderly patients increased, the hospital stay and mortality rates decreased over the study period.

Keywords: Emergency, hospitalization, surgery

INTRODUCTION

Emergencies requiring surgical intervention are increasing steadily worldwide; yet, comprehensive data on emergency surgical admissions are scarce. Despite the fact that such emergencies have similar patterns throughout the world, they may differ from one hospital to another (1). A statistical analysis of the clinical workload has gained impetus for reasons such as widespread medical audits, the need to assess the causes, management, and outcomes of general surgical emergencies, and the need to understand patient demographic and population-based profiles. Although surgical emergencies are an essential part of a hospital's workload, reports regarding the increase in emergency unit admissions (2) are either related to overall or medical admissions (3, 4).

The study by Chezian et al. (5) also reported an increase in emergency admissions between 1992 and 1999; however, the cases referred to surgery were beyond the scope of their study. Likewise, to the best of our knowledge, such cases have not been the subject of any report or have been documented after a long-term study. Increases in the aging population, social deprivation, and awareness are associated with the increase in emergency admission rates (2-4).

The aim of the present multicenter study was to assess the general surgical emergency causes, their management, and outcomes in the city of Konya, Turkey.

MATERIAL AND METHODS

Surgical emergency admissions covering a nine-year period (January 2003-January 2012) were analyzed retrospectively. Hereby, the data obtained from the four participating hospitals- Konya Numune Hospital, Konya Training and Research Hospital, Necmettin Erbakan University Meram School of Medical, and Başkent University Konya Training and Research Hospital-were analyzed.

All patients included in this study presented to the emergency service and were hospitalized in a general surgery clinic in Konya. Information on the work carried out was obtained from records of the monthly meetings held in Konya that have been regularly carried out for 15 years to discuss emergency cases. Data regarding patient evaluation, number of hospitalized patients, as well as age, diagnosis, and length

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of hospital stay were included in the study. The information was collected in accordance with the Declaration of Helsinki.

Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences 22.0 (IBM Corp.; Armonk, NY, USA) software package.

RESULTS

In total, 21,954 patients were included from the 4 participating hospitals in Konya: 7,154 from Konya Numune Hospital, 6,654 from Konya Training and Research Hospital, 6,400 from Necmettin Erbakan University Meram School of Medical, and 1,390 from Başkent University Konya Training and Research Hospital (Figure 1).

Admission rates were higher among the elderly at Necmettin Erbakan University Meram School of Medicine as compared to other centers. The majority of the patients admitted were male, and were residents of Konya (77.7%). The participants' mean age was 59.6 years, with a mean hospital length of stay of 3.3 days. The mean delay from the beginning of the symptoms until presentation to the emergency service was 2.1 days. The diagnoses of the admitted patients were as follows: acute appendicitis (59.57%), bowel obstruction (11.12%), trauma (7.97%), strangulated inguinal hernia (5.46%), acute cholecystitis (4.87%), peptic ulcer perforation (4.09%), mesenteric ischemia (2.73%), necrotizing fasciitis (2.73%), gastrointestinal system (GIS) bleeding (1.79%), and others (1.1%) (Figure 2a-d).

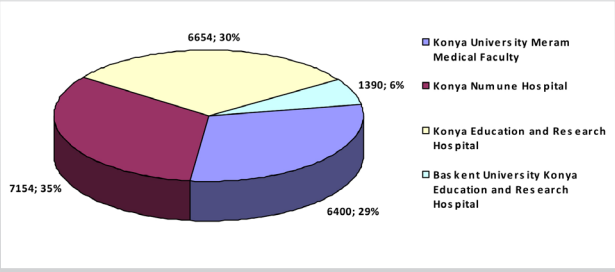

Figure 1. Patient demographic data

The mean age of the patients admitted to the university hospital emergency clinics was higher than in the other hospitals. Most patients admitted to all four hospitals were diagnosed as having appendicitis, but in the university hospitals, the ratio of appendicitis was lower than that of other hospitals. In contrast, most of the complicated cases (75%) were admitted to the university hospitals.

While the number of open cholecystectomies for acute cholecystitis was higher in the first few years of this study, with the increase in the laparoscopic cholecystectomy rate and surgeon experience, this rate dropped in the latter few years. Likewise, for gastrointestinal bleeding requiring surgical intervention, with advancements in medical treatment, the need for surgery significantly decreased. According to this data, patients with diseases that have high morbidity and mortality rates and require longer hospital care and follow-up, such as necrotizing fasciitis and mesenteric ischemia, were only accepted to university hospitals. While the average age of the patients admitted to the university hospitals increased, the average hospital stay decreased as a result of advancements in postoperative care, equipment, and medication.

DISCUSSION

The progressive increase in the number of emergency surgical admissions and decreasing length of hospital stay shown in this study were in line with other recent reports on the overall tendencies in emergency units (2). These might be attributed partially to the increasing population and partially to the rapid increase in the elderly population specifically (6, 7). However, these are not the only reasons for the increase. Currently, people are presenting to emergency units more. This

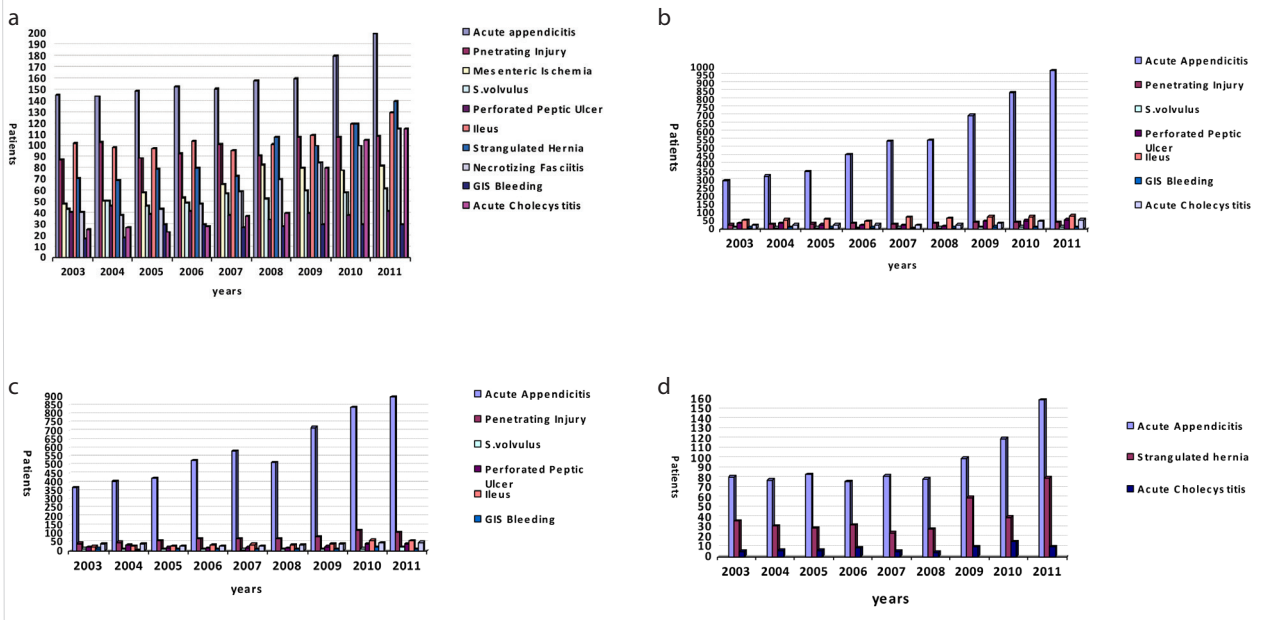

Figure 2. a-d. (a) Emergency Surgical admissions in Necmettin Erbakan University Meram Medical Faculty. (b) Emergency Surgical admissions in Konya Education and Research Hospital. (c) Emergency Surgical Admissions in Konya Numune Hospital. (d) Emergency Surgical Admissions in Baskent University Konya Training and Research Hospital

might be the underlying reason for the steady increase in the high number of abdominal pain and constipation cases in the emergency units. Moreover, to some extent, a particular number of emergency admissions are re-admissions (perhaps due to early discharge from the hospital). However, these cases are outside the scope of this study. The increasing number of emergency unit admissions did not result in an apparent need for more surgical beds, contrary to the observations made by Chezian et al. (5). Nevertheless, the increased workload in the emergency wards has brought about increased nursing, medical, and auxiliary staff needs. Bagust et al. (8) highlighted the extra empty-bed capacity needed for effective emergency unit admission management. The roots of the perceived crises within the health care system are attributed to these important considerations.

In a recent study, acute appendicitis was the most common surgical emergency (1, 9). This finding is in concordance with reports from different parts of the world with different patient series, including pregnant women. However, Anyanwu et al. (10) reported in their 1999 study conducted at the University of Ilorin Teaching Hospital, Nigeria, that superficial skin trauma was the most frequent reason for emergency surgery, followed by intestinal obstruction and appendicitis. In the present study, while appendicitis was the most frequent surgical emergency in non-university hospitals, more complicated cases, such as ileus, penetrating injuries, mesenteric ischemia, and necrotizing fasciitis were mostly admitted to the university hospitals.

Furthermore, a patient's age was an important determinant of the frequency and outcome of abdominal surgical emergencies. In the elderly with severe systemic disorders, abdominal emergency surgery can be a life-threatening condition, and hence requires a more careful evaluation as compared to younger patients. Although the number of elderly patients admitted increased between 2003 and 2012, the total number of beds occupied by elderly patients actually decreased due to shorter hospital stay. However, it would be difficult to shorten the average hospital stay any further. In this study, the mean hospital stay was 3.3 days, while it was 5.5 days in the elderly (i.e., over 70 years of age).

In our experience, the mortality rate increase in elderly patients can be attributed to perioperative risks, delay in surgical treatment, conditions that only permit palliative surgery, comorbidities, higher American Society of Anesthesiologists (ASA) grading, age above 80 years, colorectal surgery, malignant diseases, and the severity of the surgical condition.

As reported above, strangulated hernia ranked high among surgical emergencies, with a rate of 10-25% (11-14). In the present study, its frequency was 15% in university hospitals. Most of the patients were aware of the presence of an external hernia long before they became aware of the strangulation. Elective surgical management of abdominal hernia at a convenient time could prevent development of emergencies in most hernia cases. In the present study, the rate of bowel necrosis was low.

Furthermore, advanced age is an important factor contributing to the frequency of intricate malignant neoplasm. Advanced age contributes to the high mortality in free perforations into the peritoneal cavity and abdominal sepsis (6, 15). Mechanical obstructions had a significant part in this study. According to a recent report, the frequency of intestinal obstruction ranged from 15-20% of total surgical emergencies, most of them due to postoperative adhesions. In line with the findings of the present study, obstructive malignancies were reported as an age-related pathology.

In addition, geographical location had a significant effect on large bowel obstruction in this study. Compared to the elderly Western population, volvulus is the leading cause of large bowel obstruction in Turkey. In particular, cardiovascular disorders may lead to mesenteric vascular occlusion that may lead to a surgical emergency (16). The frequency of acute mesenteric ischemia was less than 10% in the present study, similar to other recent reports. Its clinical course and outcomes are more destructive than any other abdominal emergency.

In the present study, vascular occlusion related bowel necrosis ranked the highest among surgical emergencies. The surgical intervention for mesenteric vascular occlusion related bowel necrosis is limited and rarely successful. The findings of Mamode et al. (17) were in line with ours reporting 81% mortality.

Acute gastrointestinal hemorrhage necessitating a surgical intervention has severe consequences, depending on concomitant diseases. Although its frequency is rare, the mortality rate in surgically treated gastrointestinal hemorrhage is the highest as compared to other surgical emergencies. The prognosis of upper gastrointestinal hemorrhage was less evident pronounced in patients with serious comorbidities, with a mortality rate reaching up to 22.4% (6). An increase in operations for biliary and diverticular disease was reported in several studies related to emergency wards (18, 19). Regardless of age, acute calculous cholecystitis is the most common surgery in relation to biliary diseases. In line with the current literature, the present study determined that peptic ulcer complications are now fewer, due to the presence of more effective medical therapies.

CONCLUSION

- The present study documented a steady increase in emergency unit surgical admissions.
- Non-traumatic acute abdomen was the most common reason for general surgery admissions.
- Appendectomy was the most frequent operation in state hospitals.
- Mesenteric ischemia was the most fatal emergency.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - A.T.; Design - M.Ç.; Supervision - A.K.; Resources - T.K.; Materials - B.E.; Data Collection and/or Processing - E.T.; Analysis and/or Interpretation - M.B.; Literature Search - M.B.; Writing Manuscript - M.Ç.; Critical Review - M.Ç.

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