



Non-trauma surgical emergencies in adults: Spectrum, challenges and outcome of care



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HIGHLIGHTS

- Non-trauma conditions constitute a third of surgical emergencies and a quarter of deaths in the emergency room.
- Acute abdomen, urological conditions and malignancies are the leading causes of non-trauma emergencies.
- Available facilities could provide care for only half of the non-trauma patients requiring emergency room admission.

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ABSTRACT

Introduction: Significant deaths of between 21% and 38% occur from non-trauma surgical conditions in the accident and emergency room. Access to emergency surgical care is limited in many developing countries including Nigeria. We aimed to study the spectrum of non-trauma surgical emergencies, identify challenges in management and evaluate outcomes.

Methods: A one year prospective cohort study of all non-trauma emergencies in adults seen at the surgical emergency room of LASUTH from 1st October, 2011 to 30th September, 2012 was conducted. Data was analyzed using SPSS version 15.0.

Results: Of a total of 7536 patients seen, there were 7122 adults. Those with non-trauma conditions were 2065 representing 29% of adult emergencies. Age ranged between 15 and 97 years and male to female ratio was 1.7:1. Acute abdomen (30%), urological problems (18%) and malignancies (10%) were the most common. Among 985 patients requiring admission only 464 (47%) were admitted while the remaining 53% were referred to other centers. Emergency surgical intervention was carried out in 222 patients representing 48% of admitted patients. There were 12 (24%) non-trauma deaths in the emergency room. They were due to acute abdomen and malignancies in half of the cases.

Conclusion: Facilities for patients needing emergency care were inadequate with more than half of those requiring admission referred. Attention should be paid to the provision of emergency surgical services to the teeming number of patients seen on yearly basis in the Teaching Hospital.

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1. Introduction

Surgical emergencies represent more than 50% of surgical admissions and constitute a major part of the surgeon's workload in most parts of the world [1]. Proportion of non-trauma surgical emergencies is reported to be between 30% and 57% [2,3] with more than half requiring surgical intervention [1]. This is higher

than 30%–50% of trauma patients who will require emergency surgery [1,4]. Significant deaths occur in the emergency room from non-trauma surgical conditions as reports from centres in Nigeria showed that between 21% and 38% of deaths in the accident and emergency room are from non-trauma cases [2,3,5]. Acute abdomen, acute urinary retention, cutaneous abscesses, non-trauma Neuro-surgical and Cardiothoracic diseases are the leading causes of non-trauma surgical emergencies in many centers worldwide [1,3,5,6]. However, this pattern varies depending on geographical location and continues to change as a result of socio-demographic and environmental factors. For example, acute

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appendicitis which was thought to be infrequent among Africans is now the most common cause of acute abdomen in the West African sub-region [7,8]. Economic advancement has led to increasing intake of refined fibre-depleted diet which forms tenacious, firm and slow-moving faeces. This encourages formation of faecoliths which obstruct the appendix [9].

Global health policies have not accorded provision of emergency medical services the desired attention especially in low and medium income nations. In these countries, prevention of communicable diseases and reduction of maternal mortality are given greater priority. In advanced countries, prompt emergency medical care is provided through well-organized social insurance systems in addition to efficient pre-hospital and hospital medical attention by well-trained and well-equipped paramedical and medical personnel [10].

Access to optimal emergency surgical care is limited in many developing countries including Nigeria, in effect, this causes delayed intervention and poor outcomes. Inadequate financial resources and manpower needed for provision of standard surgical services, deficiencies in the provision of basic laboratory and blood banking services coupled with difficulties in procuring materials required for resuscitation and surgery are some of the factors responsible for the delay and increased morbidity and mortality [3,5,11].

Lagos State University Teaching Hospital (LASUTH) was transformed from a General Hospital to a University Teaching Hospital in the year 1999 and has attracted large numbers of patients from within and outside Lagos State. It is 750 bedded and has all major clinical departments. The surgical emergency unit has 30 beds and provides emergency surgical care to both trauma and non-trauma cases. Non-trauma paediatric surgical patients are however seen at the paediatric emergency room. Patients with trauma-related conditions are offered free medical treatment in the first 24 h. This privilege has not been extended to non-trauma emergencies. Although, few studies were carried out in the past on surgical emergencies in Lagos [3,7], the present status of the hospital may present a new spectrum of diseases and challenges. It is, therefore, desirable, as we have aimed, to assess the spectrum/pattern of non-trauma surgical emergencies in our center, identify immediate challenges in management and evaluate outcomes. These may assist in planning service delivery, improve efficiency and reduce morbidity and mortality from these conditions.

2. Methods

A one year prospective cohort study of all non-trauma emergencies in adults seen at the surgical emergency room of Lagos State University Teaching Hospital (LASUTH) from 1st October, 2011 to 30th September, 2012 was conducted. These were patients who presented with non-trauma conditions for which emergency surgical intervention is often required to treat successfully. Study protocol was specifically designed and employed for prospective data collection after pre-testing on a convenient sample size. Data sought included patient's age, sex, source of referral if the patient was referred, duration of symptoms and initial diagnosis at the emergency room. We also looked at whether the patient was admitted, referred to another hospital, treated and referred to LASUTH clinics or treated and discharged. Reasons for referral were also documented. For those admitted into the emergency room, their initial vital signs, type of treatment and whether patient survived or died in the emergency room were recorded. Subsequent treatment (operative or non-operative), final diagnosis for the patients that had surgery and final outcome of treatment were retrieved from theatre, ward and patient's records. SPSS version 15.0 was used in data analysis. Frequencies, proportions, means and

standard deviations were determined. Test of significance was done using chi square and p-value set at 0.05.

3. Results

A total number of 7536 patients presented to the surgical emergency room of LASUTH during the study period. Adults were 7122 (95%) while the rest were children. Adult patients with non-trauma conditions were 2065 representing 29% of all adult emergencies. Age of the patients ranged from 15 to 97 years with a mean of 44.9 years ($SD = \pm 18.32$). Ages of 10 patients were not known. Males were 1288 (62.4%) while females were 777 (37.6) giving a male to female ratio of 1.7:1. Fig. 1 shows age and sex distribution of the patients. Majority (53.7%) of non-trauma patients were referred to our center from another hospital. Diagnoses in these patients were mainly acute abdomen (31.6%), urological emergencies (20.1%) and malignancies (12%). They were referred from General hospitals and private health institutions due to lack of improvement in their clinical conditions and need for further evaluation and treatment in a tertiary hospital. About two-third among the patients with non-trauma conditions presented more than 48 h after commencement of symptoms; majority (76%) of these patients who presented late were referred from another hospital. There is a statistically significant association between presentation after 48 h of symptoms (late presentation) and having visited another hospital before reporting at LASUTH ($p < 0.001$).

Spectrum of non-trauma cases presenting to the casualty are as shown in Table 1. Acute abdomen and urological emergencies were the leading non-trauma emergency conditions. Acute urinary retention constituted 70% of the urological emergencies while 53% of the malignancies were breast cancer. Outcome following initial assessment by the Casualty Officers are shown in Table 2. Only 464 patients (23%) were admitted into the casualty for further treatment representing 47% of 985 patients who required emergency room admissions. Among the admitted patients, 196 (42%) were referred from another hospital. The Remaining 521 patients (53%) were referred to other tertiary hospitals because of shortage of beds for admission. Four out of 5 were referred to the Lagos University Teaching Hospital – a Federal tertiary institution. Out of these 521 patients referred to another hospital, 342 (66%) had visited another hospital from where they were referred to our center. Acute abdomen (30.2%), bone/joint pains and soft tissue swellings (21.5%) and urological emergencies (19%) were the main conditions admitted for treatment whilst more than three-quarters of patients referred to other tertiary centers presented with acute abdomen (49%), malignancies (12.3%) and urological conditions (11.7%). Patients who were seen, treated and referred to the appropriate clinic in LASUTH had mainly urological emergencies (21.1%), acute abdomen (18.7%), soft tissue swelling/joint and bone pains (12.7%) and malignancies (13.2%).

Among the patients admitted for treatment, 222 (52.3%) had emergency surgical intervention representing 64% of all emergency operations carried out in the theatre during the study period. The non-trauma emergency operations were carried out within 24 h of admission in only 25%. Table 3 shows the operative diagnosis in the patients. Acute appendicitis/perforated appendix and intestinal obstruction were the most frequent indications for surgery. Complicated abdominal wall hernia was the cause of obstruction in 52%. Peritonitis followed perforated peptic ulcer in 16 patients (7.2%) Peritonitis from perforated typhoid ileitis was seen only in one patient.

A total of 49 trauma and non-trauma deaths occurred in the emergency room; twelve (24%) were from non-trauma conditions. Majority (83%) of patients that died from non-trauma conditions were referred cases. The two main causes of non-

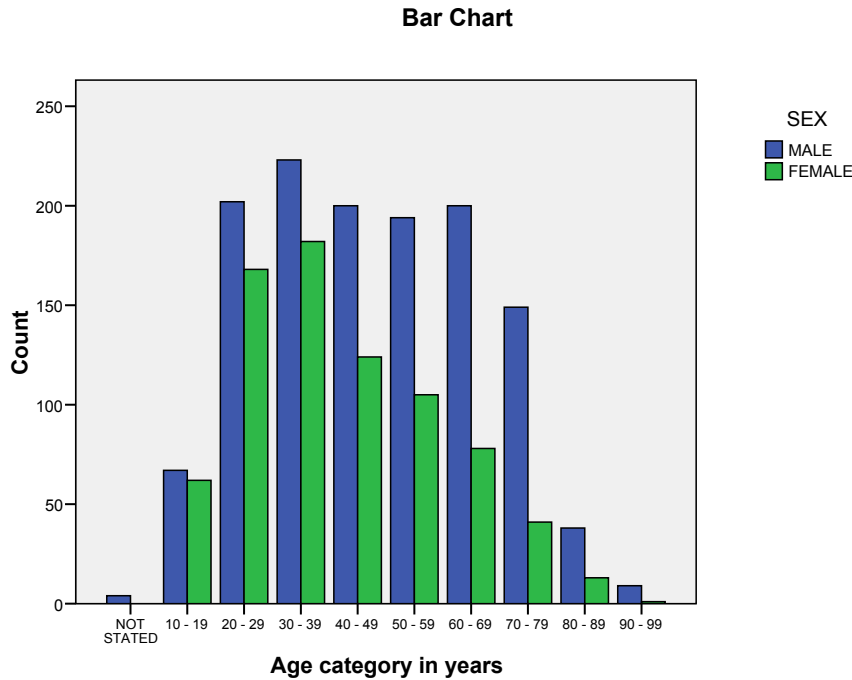


Fig. 1. Age and sex distribution of non-trauma emergencies.

trauma deaths were acute abdomen and malignancies in 50%. There is a statistically significant higher death rate among patients who had visited another hospital before being referred to us ($p = 0.026$). In addition, twenty seven patients among the non-trauma emergency admissions during the study period died on the ward making a total of 39 deaths (9.2%). Deaths on the wards were mainly from malignant intestinal obstruction in 60% and gastro-intestinal bleeding in 15%.

4. Discussion

By indication and timing, emergency surgical conditions are the aspects of diseases which present acutely and therefore need surgical intervention [12]. It may be trauma or non-trauma related. Acute abdomen is the most common condition in this

study. It is the most common non-trauma condition worldwide [13]. A recent study conducted in another tertiary institution in Lagos reported similar finding [3]. Urological emergency from acute urinary retention is another frequent reason for non-trauma admissions, coming second to acute abdomen in many reports [2,3,14]. Global increase in urological emergencies has been observed. This is attributed to ageing population and increase in benign prostatic hyperplasia; a common cause of acute urinary retention [13]. Malignancies are also becoming a more frequent cause of non-trauma surgical emergencies. Incidence of malignant conditions especially breast cancer is increasing in many developing countries [15]. It is, therefore, expected that more cancer patients presenting with complications requiring urgent attention will be presenting to the emergency room.

Table 1
Spectrum of non-trauma cases presenting to the emergency room of LASUTH.

Diagnosis	Males number (%)	Females number (%)	Total (%)
Acute abdomen	386 (18.7)	226 (10.9)	612 (29.6)
Urological conditions	362 (17.5)	12 (0.6)	374 (18.1)
Malignancies	55 (2.7)	156 (7.5)	211 (10.2)
Joint/bone pains	81 (3.9)	74 (3.6)	155 (7.5)
Limb/soft tissue swellings	71 (3.4)	65 (3.2)	136 (6.6)
Medical conditions	77 (3.7)	54 (2.6)	131 (6.3)
ENT/Eye conditions	48 (2.3)	53 (2.6)	101 (4.9)
Gastro-intestinal bleeding	54 (2.6)	21 (1.0)	75 (3.6)
Skin ulcers	39 (1.9)	20 (1.0)	59 (2.9)
Peri-anal conditions	34 (1.6)	16 (0.8)	50 (2.4)
Neurosurgical conditions	26 (1.3)	11 (0.5)	37 (1.8)
Gynaecological conditions	0 (0.0)	26 (1.3)	26 (1.3)
Thoracic conditions	17 (0.8)	8 (0.4)	25 (1.2)
Dental conditions	8 (0.4)	16 (0.8)	24 (1.2)
Sepsis/fever	14 (0.7)	6 (0.3)	20 (1.0)
Complicated goiters	1 (0.05)	6 (0.3)	7 (0.35)
Enterocutaneous fistula	3 (0.14)	1 (0.05)	4 (0.19)
Colostomy prolapse	2 (0.09)	1 (0.05)	3 (0.14)
Other conditions	10 (0.48)	5 (0.24)	15 (0.72)
Total	1288 (62.4)	777 (37.6)	2065 (100)

Table 2
Outcome of non-trauma and trauma emergencies in the emergency room.

Outcomes	Non trauma number (%)	Trauma number (%)	Total (%)
Treated and discharged	225 (10.9)	2073 (41)	2298 (32.3)
Treated and referred to LASUTH clinic	840 (40.7)	764 (15.1)	1604 (22.5)
Admitted for further treatment	464 (22.5)	1294 (25.6)	1758 (24.7)
Referred to another tertiary hospital	521 (25.1)	852 (16.9)	1373 (19.3)
Died in casualty	12 (0.6)	37 (0.7)	49 (0.7)
Discharged against medical advice	3 (0.2)	37 (0.7)	40 (0.5)
Total	2065 (100)	5057 (100)	7122 (100)

The spectrum of surgical diseases continues to change especially in low and medium income countries due to increase ageing of the population and urbanization. This has implications for planning service provision and manpower development in such areas. More than half of our patients who needed hospital admission could not be admitted due to lack of bed space and most were referred to another University Teaching Hospital in the city. Formal referral system where availability of admission space and readiness to receive referred patients are assured before referral is, unfortunately, not being practiced currently between the two major tertiary institutions in Lagos. Equally, there is no feedback on whether or not the patient was accepted and the findings if they were operated upon. The fate of those patients referred is thereby not known and are likely to have poorer outcome. This is worrisome because majority of referred patients were initially referred to our center from another hospital hoping to receive attention. It is reported that patients with non-traumatic surgical emergencies who are referred have worse outcomes than those with similar diagnosis who are admitted directly to the tertiary center [16]. There is evident inadequacy in the facilities to care for non-trauma emergencies in our center. Studies have shown that most of the developing countries especially Sub-Sahara Africa lack sufficient infrastructure to carry out what is deemed by the World Health Organization to be essential for the provision of emergency and essential surgical care with majority lacking adequate basic infrastructure and capacity to provide 24-h emergency surgical care [17,18].

Half of the patients in this study were either treated and discharged or treated and referred to relevant clinics in the hospital. These were patients that could be attended to at the primary or secondary level of health care and if needed, referred to LASUTH clinics. This could have decongested the emergency room and allowed caregivers concentrate on patients with more serious conditions. It is evident that there was underutilization of the primary and secondary health facilities in Lagos which may be either system or patient related. In a report from Pakistan, patients bypassed the lower levels of care because of dissatisfaction with the quality of care, non-availability of physician and belief that their illness could not be handled at the lower level centers [19]. Identified system factors responsible for bypass include location of

hospitals at different levels, relative quality and cost of services and implementation of guidelines for efficient referral system [20].

Two thirds of emergency operations carried out during the study period were for non-trauma conditions although trauma cases admitted for treatment were more than twice the number of patients with non-trauma conditions. Only a quarter of non-trauma surgical procedures were done within 24 h of admission. This was due to either delay in getting the pre-operative investigations done or lack of theatre space. A study in Pakistan found that the most common cause of delayed surgical intervention was inefficiency of the surgical team doctors [21]. However, studies in Nigeria revealed that financial constraint on the part of the patients (patient factor) and system failure: divided into theatre, anaesthetist, nurses and surgeon factors, lack of electricity, unplanned public holidays and incessant strikes by Health workers were the common causes of delay [3,11,22]. Studies have shown that non-trauma emergencies require surgical intervention more often than trauma emergencies [1,13].

Surgery for acute abdomen constituted two thirds of non-trauma operations with acute appendicitis/ruptured appendix and intestinal obstruction being the most common diagnosis. In reports from institutions in this region and other parts of the world, surgery for acute appendicitis was the most frequent non-trauma emergency procedure [3,8,14,23,24]. Complicated hernia is the most frequent cause of intestinal obstruction in our practice, similar to finding in a previous report from our institution [7]. In Sierra-Leone, intestinal obstruction due to complicated hernia was the most common indication for emergency abdominal surgery [25]. Only one patient with perforated typhoid was seen during the study period. Peritonitis resulting from typhoid infection is becoming rare among adults and children in Lagos [26]. Improved sanitation, access to portable water and availability of potent antibiotics could be responsible for this observation.

A quarter of deaths in the emergency room are from non-trauma related conditions. It is also reported that acute abdomen and advanced malignancy are the major causes of deaths in these patients [5,14]. These are similar to our findings. Higher death rate was observed among patients referred to our hospital. Majority among them presented late with complications which may have contributed to the deaths. Identified reasons for deaths in a

Table 3
Operative diagnosis in non-trauma patients.

Diagnosis	Number male (%)	Number female (%)	Total (%)
Acute appendicitis/perforated appendix	35 (15.8)	27 (12.2)	62 (28)
Acute intestinal obstruction	43 (19.3)	19 (8.6)	62 (28)
Perforated peptic ulcer	12 (5.4)	4 (1.8)	16 (7.2)
Acute urinary obstruction	30 (13.5)	0 (0)	30 (13.5)
Testicular torsion	19 (8.5)	0 (0)	19 (8.5)
Diabetic foot gangrene	8 (3.6)	3 (1.4)	11 (5)
Acute respiratory obstruction	4 (1.8)	1 (0.4)	5 (2.2)
Others	10 (4.5)	7 (3.2)	17 (7.6)
Total	161 (72.4)	61 (27.6)	222 (100)

previous study include late presentation, having spent considerable time in another hospital, inability to carry out required investigations and failure to have needed immediate surgical intervention [5]. Data collection for this study ended in 2012 and there may have been changes made within the last 3 years. This is, therefore, a limitation to our study.

5. Conclusions

Nearly a third of patients presenting to our emergency room had non-trauma related ailments. However, less than half among those requiring admission were eventually admitted while the remaining were referred. This indicates inadequate facilities to care for increasing number of patients needing emergency care. It is desirable therefore that more attention be paid to provision of emergency surgical services to reduce morbidity and mortality from surgical emergencies. The World Health Organization has recognized the gaps in the provision of emergency and essential surgical and anaesthetic services in developing countries with resultant high rates of deaths and disability from surgically treatable conditions. This has led to inclusion of provision of these services as a cost-effective component of primary health care [27]. There is need for establishment of an effective referral system in Lagos to minimize the hardships that referred patients may face during referrals. More than fifty percent among patients visiting the emergency room presented with conditions that were not serious enough to require admission. Strengthening the primary and secondary health facilities in Lagos could help handle many of these conditions and reduce pressure on our centre which appears overwhelmed.

Ethical approval

Study was observational and exempted from Ethical approval.

Sources of funding

Study was funded by the authors.

Author contribution

N A Ibrahim-conceptualization, data collection and analysis, writing the initial draft.

M A Oludara-conceptualization, data collection, revision of the final draft.

A Ajani-conceptualization, data collection, revision of the final draft.

I Mustafa-conceptualization, data collection, revision of the final draft.

R Balogun-conceptualization, data collection, revision of the final draft.

O Idowu-conceptualization, data collection, revision of the final draft.

R Osuji-conceptualization, data collection, revision of the final draft.

F O Omodele-conceptualization, data collection, revision of the final draft.

A O Aderounmu-conceptualization, data collection, revision of the final draft.

B A Solagberu-conceptualization, data collection, revision of the final draft.

Conflicts of interest

No any conflicts of interest.

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