INGUINAL HERNIORRHAPHY IN THE ELDERLY IN A LOW RESOURCE SETTING-A MULTICENTRE PROSPECTIVE STUDY

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ABSTRACT

Objectives: Generally, the incidence of inguinal hernias is high in the elderly as a result of progressive musculo-aponeurotic weakness and numerous causes of increase in intra-abdominal pressure like bladder outlet obstruction, chronic obstructive pulmonary disease, obesity and intra-abdominal tumors. The purpose of this study is to evaluate the prognostic indicators of outcomes after surgical repair of inguinal hernias in the elderly.

Materials and Methods: A prospective multicenter study between January 2013 to December 2017 was done. Elderly patients (both elective and emergency cases) with inguinal hernias treated surgically within the study period formed the study population. Moribund patients and those with advanced malignancy were excluded.

Results: There were 86 patients presented as emergency cases while 262 patients were elective cases. Of the emergency group, 59 (68.6%) presented with strangulation, 21 (24.4%) had obstruction while six (7.0%) had incarceration. Fifty four of the 86 emergency cases (62.8%) had intestinal resection. Overall, the resection rate for the entire 348 cases was 15.5%. In the emergency group, 12 patients (14.0%) presented within 24hours following onset of acute complications, the rest, 74 patients (84.0%) waited beyond 24 hours before presentation at the emergency unit. In the elective cases, 61 (23.3%) patients received mesh implants. Post-operative morbidity was 83.1% in the emergency arm and 19.5% in the elective group. Similarly, mortality rates were 15.1% and 0.8% for emergency and elective repairs respectively.

Conclusion: Inguinal hernias are common in the elderly population and often coexist with comorbidities. It is clinically gainful when the hernias are repaired electively to avoid the attendant high morbidity and mortality rates associated with emergency operations.

Keywords: *Elderly, inguinal, mortality, repair, wound*

INTRODUCTION

In recent time, there has been an improvement in technology-driven global health care delivery that led to progressive growth in the elderly population, especially in developed nations[1,2]. In Turkey, an estimated six million people were older than 65years of age in 2014[1].

Generally, the incidence of inguinal hernias is higher in the elderly as a result of a progressive musculo-aponeurotic weakness and increased basal intra-abdominal pressure[1,2]. Advancing age and severe comorbidities can be relative contraindications for surgery in patients with asymptomatic inguinal hernia at low risk for complications[1,2]. Nevertheless, extreme

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caution is demanded to forestall development of complications before repair, as the incidence of emergency surgeries among this patient population has increased significantly in recent years[1,2,3]. Current guidelines issued by the European Hernia Association recommend watchful waiting in asymptomatic geriatric patients and patients with mild symptoms or comorbid conditions[1]. However, published data indicate that emergency surgery in the elderly has a high mortality rate and an incidence of severe complications ranging between 3% and 88%[2]. The rationale for surgical treatment of inguinal hernias in the elderly is to cure inguinal pain and discomfort associated with the hernia and to prevent emergency in case of incarceration, obstruction, strangulation, gangrene or perforation which are clearly associated with adverse clinical outcomes[1,2,4,5]. In Italy, post-operative adverse outcomes after emergency groin hernia repair in the elderly patients were uniformly elevated[6]. Further analysis showed that the rate of severe bleeding (46.6%), infection (60.0%), urinary infection (66.6%) and mortality (6.6%) were found in those aged above 75 years and these figures were exceptionally higher compared to the cohorts aged 75 years and below[6]. The authors also observed that comorbidities were more frequent in those aged above 75 years and intestinal strangulation occurred in 60.0% of those above 75 years compared to 38.9% in the 75 years and below category[6]. Previous investigators have shown that strenuous works, short duration of hernia, higher rate of comorbidities in combination with the use of general anaesthesia in elderly patients with inguinal hernias increase the risk and severity of complications[1,6,7,8].

Indeed, the above data emanated from western literatures with far higher life expectancy than Africans and other developing nations and brings to the limelight an imperative requirement for results derived from indigenous studies. Available data from our environment on this subject are scarce and poorly documented, often in the general reports on inguinal hernias. The aim of this multicenter study is to highlight the complication rates after inguinal hernia repair in elderly in a low resource setting.

Patients and Methods

Design and Setting

This was a prospective study involving all consecutive elderly patients with inguinal hernias recruited over five years period from January 2013 to December 2017. All the patients were managed at the three hospitals in southeast Nigeria.

Subjects

All elderly patients aged 65years and above who presented with either elective or complicated inguinal hernia within the study period were included. Selection criteria for mesh hernioplasty included inguinoscrotal or inguinolabial hernia, bilateral hernias, recurrent hernias or large defect $\geq$4cm in diameter. Patients with advanced intra-abdominal malignancy, moribund patients or those who refuse to give consent were excluded. Informed consent was obtained from all the patients before they were enrolled in the study.

Procedure

Initially, all consecutive adult patients with inguinal hernias presenting within the study period were noted. There were 348 elderly patients aged 65 years and above who gave consent for the study and they formed our study cohorts. Each of the 348 patients was evaluated clinically, his or her socio-demographic and relevant clinical data recorded and entered into a standard proforma. Those admitted through accident and emergency unit with complicated disease were initially resuscitated before operative repair of the hernias.

Those scheduled for elective repair were admitted a day or two before surgery to enable pre-operative optimization, especially for those with multiple comorbidities. Basic and special investigations like full blood count, serum electrolytes, urea, creatinine, fasting blood sugar, chest x-ray, electrocardiography, liver function test, urinalysis and abdominal ultrasound were routinely done. After evaluation and laboratory investigations, findings were discussed with the patients and /or their relatives. Informed consent for

surgery was obtained pre-operatively and deep vein thrombosis (DVT) prophylaxis was commenced routinely. All active infections, anaemia and malnutrition were corrected in all patients before surgery.

All the patients were reviewed by either specialist anesthesiologists or nurse anaesthetist (occasionally specialist anesthesiologists) for cases in the mission hospitals. Intra-operatively, the nature (direct or indirect or pantaloons) of the hernia, the size of the defect and contents of the sac were noted. In elective procedures, nylon darn was routinely done for posterior wall reinforcement, but in those scheduled for mesh implants, onlay polypropylene mesh placement in the Lichtenstein fashion was executed. Most of the emergency operations were done through a groin incision, the rest through a midline laparotomy incision. Intestinal resections, wedge resection and closure, stoma formation or simple release of obstructed bowel were performed as were indicated in cases of complicated hernias. Tube drain was inserted when indicated and skin sutures removed on the 10^{th} -14^{th} post-operative day. Early post-operative complications were noted and recorded. None of the patients was managed on day case basis. Patients were followed up for 24 months. Records of late post-operative complications were noted and entered into a proforma. Eighty-six (24.7%) cases were repaired by generating duty doctors working in the mission hospitals.

Data Analysis

Data analysis was done using Statistical Package for Social Sciences (SPSS) software version 22.0 (IBM, Chicago, IL, USA, 2015). Data were presented as mean, standard deviation, percentages and tables. Confidence interval was calculated at 95% level and significance at 5% probability level ($p<0.05$).

Ethical Approval

The protocol for this study was approved by the research and ethics committee of the three hospitals before commencement of the study. The study was carried out in accordance with the institutions' requirements. All ethical principles enshrined in the 'Helsinki Declaration' on study involving human subjects were followed.

Results

During the period under review, 3,625 adult patients with inguinal hernias were seen, but only 348 (9.6%) were aged 65 years and above, who also gave consent for the study. There were 289 (83%) males and 59 (17%) females with inguinal hernias, giving a male to female ratio of 5:1. The ages of the patients ranged between 65-98 years. Eighty-six (24.7%) patients presented emergently, the rest (262, 75.3%) presented as elective cases. There were 53 (15.2%) bilateral cases; 42 cases were harbored by patients with elective presentation and 11 cases on those that presented emergently, but there were no cases of simultaneous bilateral complications throughout the period of study.

The centre-specific distribution of the patients and the annual incidence of the hernias are shown below (Table 1). Majority (214, 61.5%) of the patients have lived with their hernias for more than three years before presentation. Of these, 30.0% (64) had harbored the hernias for more than 20 years before presenting electively or before complications developed. Only a handful of patients (22, 6.3%) harbored their hernias for six months or less before presentation. Two hundred and ninety-three (84.2%) patients had associated medical illnesses ranging from hypertension (122, 35.1%), Diabetes mellitus (47, 13.5%), benign prostatic hyperplasia (42, 12.1%) to chronic obstructive pulmonary disease (28, 8.0%) and others (54, 15.5%). Approximately one-fifth (72, 20.7%) of the patients had more than one comorbidity. Furthermore, 19 of the 122 hypertensive patients and 21 of the 47 diabetic patients had other associated comorbid diseases (Table 2). Overall, 59 (68.6%) of the 86 patients with emergency presentation had strangulated inguinal hernia (SIH), twenty-one (24.4%) had bowel obstruction and six (7.0%) had incarceration. Fifty four out of the 59 cases with strangulated hernia had intestinal resection giving rise to an overall resection rate of 15.5%% for elderly patients with inguinal hernias (both elective and

complicated) and 62.8% for elderly patients with complicated inguinal hernias.

The post-operative complications were more frequent in those that presented emergently compared to those repaired electively. A total of 123 (35.3%) patients developed complications after operative repair, though 48 (39%) of these patients had more than one complication. Wound infection was the commonest complication and occurred at the rate of 24.4% in the emergency cases and 3.8% in the elective group. The length of hospital stay (LOHS) were also longer in those repaired emergently (Table 3). The effects of some clinical parameters like comorbidities, size of hernia, hernia recurrences, length of delay before presentation with complicated disease and operation waiting time (while on admission) were shown below (Table 4). Majority of the morbidities and mortality were found in those with emergency presentation and cases operated under general anaesthesia. Other predictors of morbidity and mortality were bowel resection, American Association of Anaesthesiologists (ASA) score and status of surgeon. A third (116,33.3%) of the cases were repaired by board certified surgeons, 146 (42.0%) by trainee surgeons and 86 (24.7%) by medical officers. The impact of these peri-operative parameters on the morbidity and mortality rates are shown below (Table 5). The overall mortality rate was 4.3% (15 deaths; two in elective and 13 in emergency cases). Of the 333 surviving patients, 268 (80.5%), 213 (64.0%) and 174 (52.3%) patients were available for follow up at six, 12 and 24 months respectively.

Table 1: Mode of presentation and annual distribution of the patients.

Parameter	Elective	Emergency	Total (%)
Institution			
AEFUTHA	123	42	165 (47.4)
BSH	96	30	126 (36.2)
MMH	43	14	57 (16.4)
Total	262 (75.3)	86 (24.7)	348 (100.0)
Annual rate			
2013	44	20	64 (18.4)
2015	42	21	63 (18.1)
2016	50	15	65 (18.7)
2017	55	16	71 (20.4)
2017	71	14	85 (24.4)
Total (%)	262 (75.3)	86 (24.7)	348 (100.0)

*AEFUTHA =Alex Ekwueme Federal University Teaching Hospital Abakaliki.
†BSH =Bishop Shanahan Hospital.
‡MMH =Mater Misericordie Hospital.

Table 2: Distribution of comorbid medical conditions

Comorbidity	Number of patients (*)	Percent (%)
Systemic hypertension	122 (*19)	35.1
Diabetes Mellitus	47 (*21)	13.5
Chronic obstructive pulmonary disease	28 (*8)	8.0
Benign prostatic hyperplasia	42 (*6)	12.1
Cancer of Prostate	2	0.6
Obesity	10 (*7)	2.9
Breast cancer	1	0.3
Osteoarthropathy	14 (*2)	4.0
Goitre	1	0.3
Cardiac disease	5 (*2)	1.4
Chronic kidney disease	5 (*5)	1.4
Chronic liver disease	3	0.9
Cholelithiasis	2	0.6
Neurological disease	9 (*2)	2.6
Pyelonephritis	2	0.6
Total	293 (*365)	84.2

*Some patients had two or more comorbidities.

Table 3: Post-operative outcomes

Outcome	Emergency	Elective		
Complications	Number of patients (%)	Number of patients (%)	χ^2	p-value
Wound infection	21 (24.4)	10 (3.8)		
Seroma	4 (4.7)	9 (3.4)		
Scrotal Oedema	4 (4.7)	6 (2.3)		
Haematoma	5 (5.8)	4 (1.6)		
Sepsis	6 (7.0)	1 (0.4)		
Intra-abd abscess	5 (5.8)	1 (0.4)		
Entero-cut.Fistula	3 (3.5)	1 (0.4)	13.559*	0.032
Atelectasis	4 (4.7)	1 (0.4)		
Visceral injury	4 (4.7)	2 (0.8)		
Prolonged ileus	5(5.8)	3 (1.2)		
UTI	2 (2.3)	2 (0.8)		
Recurrence	7 (8.2)	7 (2.7)		
Chronic groin pain	2 (2.3)	4 (1.6)		
Total (%)	72 (83.7)	51 (19.5)		
LOHS (days)				
< one day	0 (0.0)	2 (0.8)		
1-3	2 (2.3)	128 (48.9)		
4-7	45(52.3)	76 (29.0)	77.380*	0.000
>7	39 (45.3)	56 (21.4)		
Total	86 (100.0)	262 (100.0)		
Mortality	13 (15.1)	2 (0.8)		

†Intra-abd= intra-abdominal;entero-cut=enterocutanous;UTI=urinary tract infection; ‡LOHS= length of hospital stay; < = less than; >= greater than
*Fisher's exact test used

Table 4: Clinico-pathologic predictors of morbidity and mortality

Parameter	Frequency	Morbidity rate (%)	Mortality rate (%)
Comorbidity			
Present	293	38.9	4.8
Absent	55	16.4	1.8
Total	348	35.3	4.3
χ^2		10.30	0.98*
p-value		0.001	0.282
Odd Ratio		3.26	2.71
95% C.I of Odd Ratio		1.47-7.44	0.36-56.36
Hernia complexity (large, recurrent)			
Present	266	42.1	4.5
Not present	82	13.4	3.7
Total	348	35.3	4.3
χ^2		22.58	0.11
p-value		0.000	0.740
Odd Ratio		4.69	1.24
95% C.I of Odd Ratio		2.29-9.85	0.32-5.70
Presentation			
Emergency	86	83.7	15.1
Elective	262	19.5	0.8
Total	348	35.3	4.3
χ^2		116.98	10.78
p-value		0.000	0.001
Odd Ratio		21.28	3.71
95% C.I of Odd Ratio		10.67-43.07	1.51-9.13
Multi-step delays (emergencies:hours)			
0-24	12	33.3	8.3
25-72	44	86.4	15.9
> 72	30	100.0	23.3
χ^2		23.248*	1.49
p-value		0.000	0.476
LOHS (days)			
0-1	2	0.0	0.0
2-3	130	16.2	0.8
4-7	113	37.2	6.2
>7	103	58.2	6.8
χ^2		45.86	6.56
p-value		0.000	0.087

*Fisher's exact test used; †LOHS length of hospital stay

Table 5: Perioperative indicators of morbidity and mortality.

Parameter	Frequency	Morbidity rate (%)	Mortality rate (%)
ASA Score			
I	120	15.8	0.0
II	98	30.6	2.0
III	74	41.9	6.8
IV	56	76.8	14.3
χ^2		64.42	21.21*
p-value		0.000	0.000
Bowel resection			
Yes	54	88.9	18.5
No	294	25.5	1.7
χ^2		80.19	31.28
p-value		0.000	0.000
Odd Ratio		23.36	13.14
95% C.I of Odd Ratio		9.12-63.41	3.89-46.66
Anaesth method			
General	154	46.8	6.5
Spinal	110	32.7	4.5
Local	84	17.9	0.0
χ^2		20.34	5.58*
p-value		0.000	0.061
Type of incision			
Groin	314	34.4	3.8
Midline laparotomy	34	44.1	8.8
χ^2		1.43	1.86
p-value		0.232	0.173
Odd Ratio		0.064	0.41
95% C.I of Odd Ratio		0.029-0.143	0.10-1.94
Status of doctor			
Surgeon	116	20.7	2.6
Trainee Surgeon	146	34.2	5.5
General duty doctor	86	57.0	4.7
χ^2		28.59	1.34
p-value		0.000	0.511

*Fisher's exact test used; †Anaesth= Anaesthesia

DISCUSSION

Over the years, discussion on hernia susceptibility, surgical repair output and high adverse post-operative aftermaths for inguinal hernia repairs in the geriatric population remained a subject of lively debate[4,5,6,9,10]. Our finding that inguinal hernia in the elderly accounted for 9.6% of all inguinal hernias seen during the study period is similar to rates of 8.1% and 8.6% in Ghana and India respectively[11,12].

However, the proportion of elderly patients with inguinal hernia is about four times higher in USA and Rome, accounting for 39.8% and 38.8% respectively of patients with inguinal hernia in the first national health and nutrition examination survey (USA) and institution-based study (Rome)[13]. The authors observed that, in the USA population, inguinal hernia is a common condition among men, and that incidence increases substantially with ageing[13]. The disparity between figures from developed

nations and developing countries may be explained by longer life expectancy in the industrialized nations.

The hospital distribution of the elderly patients was also remarkable. When all age groups were considered, the proportions of elderly patients with inguinal hernias were higher in the two rural hospitals (183, 52.6%) compared to the percentage (47.4%) from the teaching hospital (located in the urban area). This may be attributed to greater number of elderly people residing in the rural areas who were predominantly farmers, artisans and males. In support of this finding, a USA population-based study has earlier shown that the cumulative probability of inguinal hernia is higher with rural residence and males[13].

The annual rates of elderly patients with inguinal hernias rose progressively albeit, slowly; the rise was mostly due to uncomplicated hernias (Table1). This observation may be related to improvements in health care services and subsequent progressive growth in the population of geriatric people in our environment akin to findings in the developed economy albeit at slower pace. Published data from multiple clinical studies indicate that the rising geriatric population world-wide has placed enormous demand on health care providers to render surgical and medical services with quality assurance[2,9,14,15,16].

Generally, in the elderly, the trio of diminished physiologic reserve, multiple associated comorbidities and propensity towards incarceration / strangulation has made inguinal hernia repair particularly risky, especially complicated hernias operated in emergency circumstances[6,9,10]. The rate of strangulation (68.6%) or obstruction (24.4%) among emergency cases noted in this study was high compared to 17.5% found in an earlier study on inguinal hernia repair in unselected adults in Southeast Nigeria, few years ago[17]. The higher emergency presentation rate in the elderly has been reported by several investigators and reasons adduced include increased susceptibility to bowel strangulation for the same duration of irreducibility (compared to young patients), higher incidence of raised intra-abdominal pressure (due to bladder outlet obstruction, constipation, bronchitis) and alteration in abdominal wall collagen structure and tension[1,6,10].

The situation becomes worse when an elderly patient with significant comorbidities present emergently and receive surgical operation[2,4,10]. In Turkey, comorbid illnesses in the elderly population like chronic obstructive pulmonary disease (COPD), hypertension and diabetes mellitus represent important predictors of mortality in univariate analysis[1,10]. Coincidentally, high ASA scores inherent in the setting of old age (due to comorbidities or hernia complications) especially chronic kidney disease, constitute independent predictors of significant post-operative morbidity and mortality[1,4,10]. In this report, comorbidity impacted negatively on the overall postoperative outcomes, but more marked with morbidities. Nonetheless, several other factors like emergency presentation, bowel resection, ASA scores and serial delay after onset of complications were the most important predictors of morbidity and mortality in this series (Tables 4 and 5). Nevertheless, it must be emphasized that the multiplier effect of comorbidities results in occurrence of high ASA scores and therefore, indirectly impacts on mortality as well. Indeed, patients operated under emergency set up and subsequently received intestinal resection were 23 and 13 times more likely to develop morbidity and mortality respectively.

Riza and coworkers reported on a large series of 1,824 elderly patients who underwent both elective and emergency inguinal hernia repair in Istanbul, Turkey[1]. Despite similar demographic data, the frequency of intestinal resection was significantly greater in emergency group (21.0%) compared to elective repair group (1.0%) and morbidity was 24 times more common in emergency (24.0%) arm compared to elective cohorts (1.0%)[1]. Worse still, the proportions of higher ASA scores (ASA IV and V), length of hospital stay, and intensive care unit stay were all uniformly higher in the emergently operated patients, with mortality quoted at

11.0% for those managed under emergency and 0.3% for elective cases[1]. In this series, the overall mortality rate of 4.3% and a rate of 15.1% in the emergency arm were high compared to reports from Turkey[1]. Nevertheless, mortality index is quite deplorable in Africans with complicated, large and complex hernias, further supported by reports from Sokoto, Nigeria[18], where a mortality rate of 5.3% was recorded from unselected patients with inguinal hernias. Across the globe, several authors have reported similar elevated rates of mortality and morbidity when inguinal hernias were operated emergently in the elderly patients[1,2,4,6,10].

From the foregoing, an accelerated, system wide approach in the evaluation of elderly patients diagnosed with inguinal hernia is warranted. Minimal delay shall be observed before elective surgical repair, if meaningful outcomes are desired. In the current review, the impact of various peri-operative denominators like ASA scores, comorbid conditions, anaesthetic method, status of surgeon, bowel resection rates and abdominal incision types on the morbidity and mortality rates was analyzed (Table 5). In summary, bowel resection, significant delay after onset of complications, emergency presentation and high ASA scores III and IV were the major predictors of mortality and morbidity; additionally, comorbidity, complex hernias, lower rank of surgeon, anesthetic technique and long hospital admission constituted significant predictors of high morbidity in this series. There was no statistically significant difference in morbidity ($p=0.232$) and mortality ($p=0.173$) for the various incision approaches used. Remarkably, age alone is not a major determinant of poor outcomes as mortality rates were 0.0% and 1.8% in those with ASA I and those with no comorbidities respectively (Tables 3 and 4). The implication of this finding lies with an appreciation that age is a modifier of the other clinico-epidemiologic parameters and may play a permissive role when hernia complications or trauma (surgery) set in. The earlier observation[15] that the burden and adverse outcomes of surgical conditions in the low- and middle-income countries are higher than those in the developed nations highlights the importance of the health seeking behavior and quality of medical services in a population and not primarily factors like age and sex. Hence, the relative contributions of late presentation and delay after onset of complications including operation waiting time on the outcome measures were emphasized in this study (Table 4).

In this review, serial delays engendered by time lost at home before hospital presentation, delayed referral to specialist surgical team and in-hospital delays from laboratory-, theatre- and patient-related causes were the precursors of bowel ischaemia, resections and unfavorable outcomes (Tables 3 and 4). Unfortunately, surgeons sometimes may be reluctant to perform elective repair of inguinal hernia in the elderly due to increased risk of post-operative complications and other perioperative aftermaths that may be influenced by multiple cardio-respiratory, endocrine or hepato-renal comorbid illnesses[4,7]. The price for this historic surgical dilemma is the high toll of morbidity and mortality when these hernias are ultimately repaired under emergency set up, often at odd hours by a lower rank of surgeon. At times, these emergency repairs may be performed in poorly equipped centers with low volume and limited experience to undertake such tasks. Generally, emergency repair of inguinal hernias in the elderly tasks the resources and skill of even the most astute of surgeon and whenever possible, elective repair is advocated. In the event of unavoidable emergency circumstances with early presentation, expedient work up and facilitated consultations among specialist teams are warranted to consolidate on the gains of early presentation, but long serial delays especially in the presence of multiple comorbidities and high ASA scores are uniformly associated with adverse post-operative outcomes.

In a survey in Europe assessing the effects of late admissions on the clinical profile and post-operative outcomes of 189 elderly patients presenting emergently in a referral

hospital, bowel strangulation from hernia was already present in 83% of those who presented after 48hours compared to 24.1% of those seen within 24hours of onset of complications[10]. The bowel resection rate in those presenting within 24hours was 7.4%, but rose to 33.3% after 48hours of incarceration[10]. Similarly, morbidity and mortality were outrageously higher in the emergency arm after 48hours (33.3% and 9.1% respectively)[10]. The above reports clearly illustrate the magnitude of adverse outcomes that can result from undue delays in treating elderly patients with inguinal hernias, prompting several investigators to question the appropriateness of a watchful waiting policy for elective inguinal hernias in the elderly[5,19].

In a UK survey, 76.9% of patients with hernia complications who required emergency operation had earlier consulted their general practitioners[19]. They were managed conservatively on the basis of age, comorbidity and on assumption of a low likelihood of developing hernia complications[19]. Unfortunately, large proportion of them ultimately developed complications that necessitated emergency operations[19]. The authors advised that elective repair of hernias should be performed whenever possible, because of the high morbidity and mortality associated with emergency repair of abdominal hernias in the elderly and, if necessary, refer such patients to a surgeon with an interest in hernia surgery[19].

The utilization and acceptance rates of prosthetic implants for elective cases were more for those with bilateral, recurrent and inguinoscrotal or inguinolabial hernias. Similar selection criteria were observed in Enugu, South east Nigeria[20].

Conclusion: Inguinal hernias are common in the elderly population and often coexist with significant comorbid medical conditions that make repair under emergency circumstances very hazardous. It the authors' opinion that elective herniorrhaphy should be performed early in the elderly and strangulated hernia should be undertaken by specialist to prevent unwanted complications associated with gangrenous bowel in the elderly. However, when emergency operation becomes unavoidable, pre-operative optimization and judicious operative and anaesthetic techniques must be employed.

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