

*Full Length Research Paper*

# **Incarcerated external anterior abdominal wall hernias: a 5 year experience in Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State of Nigeria**

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The aim of this study is to document our first experiences in the surgical management and outcome of incarcerated external anterior wall hernias (EAAWH) in our local environment, outlining the clinical profile, treatment outcome and identify predictors of outcome among these patients. The study design used was a retrospective analysis of data. The study was conducted at the Department of Surgery, Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State, Nigeria from January 2008 to December 2012. Records of 29 patients who underwent emergency surgery for incarcerated external anterior abdominal wall hernia in a teaching hospital were analyzed for age, sex, type of hernia, characteristics of clinical presentation, duration of symptoms, past medical history, and significant concomitant diseases, ASA class, type of anesthesia, contents of the hernia sac, surgical procedures, complications, duration of hospital stay and mortality. Twenty-four (82.76%) patients were males and 5 (17.24%) were females. The age of patients ranged from 1 month to 75 years. There were 28 (96.5%) Inguinal hernias, 1 (3.5%) Para-umbilical hernias and none of Incisional and femoral hernias. Gut resection was done in 4 (13.8%) patients. The mortality rate was 3.5%. The mortality was related to septicemia from gangrenous bowel in a one month old child and late presentation. Mortality associated with emergency surgery of incarcerated external anterior abdominal hernias is related to late presentation with subsequent bowel gangrene, very young age, and associated medical illnesses.

**Key words:** Incarcerated hernia, treatment outcome, predictors, mortality, abdominal wall hernia.

## **INTRODUCTION**

An anterior abdominal wall hernia is an abnormal protrusion of a peritoneal-lined sac through the musculo-aponeurotic covering of the abdomen. Kingsnorth, Giorgobiani, Bennett (2008), Bucknell, Cox, Ellis (1982) and Mudge, Hughes (1985) stated that the common types of external anterior abdominal wall hernias (EAAWHs) are; inguinal (75%), umbilical (15%) and femoral (8.5%), rare forms comprise 1.5%, excluding Incisional hernia. Incisional hernias develop in 3.8-11.5% of patients after abdominal surgery, (Kingsnorth, Giorgobiani, Bennett (2008), Bucknell, Cox, Ellis (1982) and Mudge, Hughes (1985). Generally hernia mass consists of covering (skin, subcutaneous tissue), peritoneal sac and any contained viscera. If the neck of the sac is narrow where it emerges from the abdomen, bowel protruding into the hernia may become obstructed or strangulated irrespective of site.

Hernia is called strangulated when the blood supply of its contents is compromised. Gangrene may occur as early as 5-6 hours after the onset of first symptoms. The precipitating cause of obstruction and strangulation is usually unknown but is presumably some event which forces more abdominal viscera into the sac that can be easily returned (Iles, Halasz (1995). Obstructed external anterior abdominal hernias are the commonest cause of mechanical bowel obstruction and are associated with significant morbidity and mortality; with indirect inguinal hernia accounting for most (80.1%) hernias ( Madziga and Nuhu (2008). The morbidity and mortality associated with the treatment of strangulated EAAWHs remain high, as reported Archampong, Owusu and Amankwa (1984). However, early surgical intervention soon after correcting fluid and electrolyte deficits decreases the death rate associated with the repair of strangulated hernias (Davidson, 1981). Alagoa & Angaye (2010) has reported incarcerated inguinal hernia as the leading cause of acute intestinal obstruction in this centre.

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This retrospective descriptive study is of a consecutive series of 29 patients with incarcerated groin hernias during a 5-year period undertaken at the 200 beds temporary Niger Delta University Teaching Hospital located in a semi-urban area with a catchment population from Bayelsa, parts of Rivers and Delta States of Nigeria. There is paucity of published data on surgical management of incarcerated EAAWH in our environment as there is no local study which has been done in any hospital in Bayelsa State of Nigeria. This study aimed to document our first experiences in the surgical management and outcome of incarcerated EAAWH in our local environment, outlining the clinical profile, treatment outcome and identifying predictors of outcome among these patients.

We analyzed all incarcerated groin hernias repaired on an emergency basis during the study period in order to evaluate the clinical presentation and outcome.

## PATIENTS AND METHODS

The records of all patients who underwent emergency surgery for preoperative diagnosis of acute incarcerated EAAWH between January 2008 and December 2012 in our hospital, after Ethical approval was retrospectively reviewed. Incarceration was defined as irreducibility of an external hernia and strangulated hernia as irreducible with objective signs of ischemia or gangrene seen at surgery. The case notes were obtained and the following information recorded: age, sex, type of hernia, characteristics of clinical presentation, duration of symptoms, past medical history, and significant concomitant diseases, ASA class, type of anesthesia, contents of the hernia sac, surgical procedures, complications, duration of hospital stay, and mortality. Duration of symptoms was established as the period from the symptoms onset caused by incarceration to hospital admission. Significant concomitant diseases were represented by malignancies and severe major organ dysfunction and were defined as present if the patient was receiving specific drug therapy. Each patient was classified according to the physical status scale of the American Society of Anesthesiologists or ASA class (Table 1) Owens WD, (Felts and Spitznagel, 1978), which assigns a risk level for surgery and anesthesia. The method of anesthesia for surgery was spinal or general anesthesia in accordance with the patient's physiological status and the anesthetist's opinion. The method of hernia repair was determined by the individual surgeon's preference. The outcome was analyzed with respect to the hospital stay, complications, and mortality within 30 days of the operation or before discharge from the hospital. Major complications were defined as those affecting major organ systems and death.

Statistical data analysis was by Epi Info version 3.5.4 and manually. Categorical variables are reported as a percentage.

## RESULTS

During the study period, a total of 29 patients underwent emergency operations for acute incarcerated EAAWHs, consisting of 24 (82.76%) males and 5 (17.24%) females (ratio 4.8:1). Ages ranging from 1 month to 75 years, were seen during the study period. Incarcerated acute EAAWHs is more in the 21-30 years age group with 19 (65.5%) and lowest in the  $\geq 70$  least with 1 (3.5%) cases. The incidence of acute incarcerated EAAWH types of hernias is shown in Table 2. Type of hernias and their distribution according to sex are shown in Table 3. Of these, 28 (96.5%) had inguinal hernias and umbilical hernia one (3.5%). No other type was seen. There were 21 cases of incarcerated inguinal hernias, 7 strangulated and 4 cases, all males, had bowel resection and anastomosis. The mean duration of hernia was  $10 \pm 3.5$  years, ranging from 1 day to more than 25 years.

The most common presenting clinical findings for emergency admission were an irreducible mass in the abdominal wall and localized pain seen in all the cases. Nine patients (31.03%) presented signs and symptoms of mechanical bowel obstruction. Duration of symptoms prior to admission were poorly documented but varied from a few hours to 4 days. Twenty-two patients (75.86%) presented within 24 h of symptoms onset. No significant concomitant medical illnesses were found.

Twenty-four patients (82.76%) were ASA class II and 5 (17.24%) patients were ASA class III. There was 1 death giving a mortality of 3.5%. Patient was 1 month old male, ASA class III, had resection and anastomosis and dead with 12 hours post-operatively from septic induced multiple organ failure. Mortality was significantly related to the ASA classification.

Surgical repair was performed under general anesthesia in 24 cases (82.76%) and spinal anesthesia in 5 (17.24%) cases. Contents of the hernia sac were ileum only in 22 patients (75.86%), omentum only in 4 patients (13.79%), ileum with omentum in 1 (3.5%) and ileum with colon in 2 (6.9%) cases. A strangulated hernia was seen in 4 cases (13.79%), and necrotic bowel resection was required in all these patients. Small bowel resection was performed in 3 cases and colon resection in one case. The strangulation and bowel-resection rates, according to hernia types, are shown in Table 3. All the 4 cases of strangulation and bowel resection were indirect inguinal hernias.

All the patients were surgically explored through an appropriate incision according to the type of hernia. Posterior wall repair by Nylon Darn was done for all ages above 16 years and herniotomy for those less. Resection and anastomosis in two layers with Vicryl and silk was done for those that presented with gangrenous bowel due to hernia obstruction. Prophylactic and post-operative antibiotics were used as indicated. Postoperatively all patients were given a full dose of parenteral Pentazocine or Tramadol analgesic. Wound care and exposure was based on patient's factors.

**Table 1.** American Society of Anesthesiologists physical status classification.

Class Description
I Healthy patient
II Mild systemic disease, no functional limitation
III Severe systemic disease that limits activity but is not incapacitating
IV Severe systemic disease that is a constant threat to life
V Moribund patient unlikely to survive 24 h with or without an operation

In event of emergency operation, Class I can be designated as Class II.

**Table 2.** Incidence of strangulation of the various external abdominal wall hernias, by sex.

Hernia Type	Male	Female	Percent
Inguinal	23(79.3%)	5(17.2%)	96.5%
Femoral	0	0	0
Umbilical	1(3.5%)	0	3.4%
Epigastric	0	0	0
<b>TOTAL</b>	<b>24(82.8%)</b>	<b>5(17.2%)</b>	<b>(29)100</b>

**Table 3.** Incarceration, strangulation and bowel resection ratios according to hernia types.

Hernia type	Incarcerated bowel	Strangulated bowel	Bowel resection
Inguinal	21(72.4%)	7(24.1%)	4(13.8%)
Femoral	0	0	0
Umbilical	1(3.5%)	0	0
Epigastric	0	0	0

Local wound complications developed in 25 patients consisting of wound infections, hematoma, seroma, and one wound dehiscence. Mean hospital stay was  $10 \pm 6.5$  days, ranging from 1–43 days.

The effects of factors such as age, sex, and hernia type, duration of hernia, late admission, concomitant diseases, ASA class, and anesthesiologic method on unfavorable outcome were statistically not studied by univariate analysis as records were not accurately recorded in all.

All the 28 survivors have been lost to follow-up as all stopped to attend our out-patient clinics after 5-6 months postoperatively without hernia recurrence.

## DISCUSSION:

External anterior abdominal wall hernias are common in NDUTH Okolobiri, Nigeria, and the incidence of hernia strangulation is yet to be documented. Despite an improvement in the health care delivery system in developed countries, the mortality resulting from strangulated bowel obstructions that require surgical

resection remains high, as reported by Archampong, Owusu and Amankwa (1984) (20 percent) and Leffall (1970) (30 percent). Early surgical intervention was shown by Davidson (1981) to decrease morbidity and mortality. Elective hernia repair results in very low mortality (Flanagan, Bascom (1981), Tingwald, Copperman (1982) and Elechi (1987).

Inguinal hernias accounting for 28 (96.5%) of incarcerated EAAWHs is the predominant type of hernia incarceration in this study. This is the same with others. (Madziga, Nuhu (2008), Davidson (1981), Tingwald, Copperman (1982) and Elechi (1987). Femoral hernias were reported as the most frequent in the studies of Alvarez, Baldonado, Bear, Solis, Alvarez, Jorge (2004) and Perez, Antonio, Cernuda, Francisco, Suarez-Solis, Armando, (2005). There was no case of femoral incarceration in this study. Femoral hernia is said to be an uncommon variety in Africans (Oishi, Page and Schwesinger (1991). It is postulated that inguinal lymphadenitis involving the node of Cloquet in the femoral canal protects Africans from its development (Kingsnorth, Devlin and O'Dwyer (1998). These studies

are similar to our findings of low level femoral cases and incarceration in this study. Strangulating hernias and bowel resection of all cases in this study were inguinal hernias. Inguinal hernia has been reported as the commonest hernia type that strangulates (Madziga, Nuhu 2008), Davidson (1981) Elechi (1987), Alvarez, Baldonado, Bear, Solis, Alvarez, Jorge (2004), Perez, Antonio, Cernuda, Francisco, Suarez-Solis, Armando (2005). The diagnosis is usually easier in incarcerated inguinal hernias than in femoral ones, but there is not any useful connection between clinical findings and bowel viability, since the definitive diagnosis of strangulation can be made only at the time of surgical exploration (Kingsnorth, Giorgobiani, Bennett, 2008).

The frequencies of incarcerated viscera were, in decreasing frequency, small intestine only 22 (75.9%), omentum only 4 (13.8%), small intestine and colon 2 (7.0%) and small intestine and omentum one (3.5%). Of the 4 cases of bowel resections, 3 were for gangrene of small intestine and one, small intestine and colon. Small intestine as the commonest viscera that needs resection becomes gangrenous as in this study has been reported Alvarez, Baldonado, Bear, Solis, Alvarez, Jorge (2004), Perez, Antonio, Cernuda, Francisco, Suarez-Solis, Armando (2005). Elechi (1987) reported no mortality among 171 patients who had elective and emergency hernia repairs; however, the overall mortality for this group of 29 patients with incarcerated EAAWHs was one case (3.5%). For the group of 25 patients who underwent early surgical intervention without bowel resection, no mortality resulted; but for the 4 patients requiring bowel resection, the postoperative mortality was 3.5%. The only case of death recorded during the study was a one month old male with inguinal hernia. El-Rashied, Widatalla and Ahmed (2007) stated that primary inguinal hernia strangulation with bowel resection is rarely necessary in children and no bowel resection was performed in children below ten years in their study. Ameh (1999) reported high incidence of bowel resection and mortality in children at Zaria, Nigeria. Though, the study population is low, the current study is more in line with Ameh (1999). From unpublished figures in this center when it was a General Hospital before it was converted to a Teaching Hospital, the mortality is 35%. The observation that the number of patients presenting with obstructed hernias is low can be attributed to the availability of skilled surgical care and awareness of this. Provision of access to medical care is generally known to significantly reduce the morbidity and mortality associated with delayed presentation of obstructed hernia. A prospective study/ further study will be helpful to address other findings that are yet to be discovered.

## CONCLUSION

As shown, incarcerated EAAWHs can be repaired with

minimal morbidity and without mortality if surgery is performed before gangrenous bowel change has occurred. Overall morbidity and mortality is significantly affected by bowel resection. Elective surgical repair of EAAWHs is recommended to avoid potentially serious complications.

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