

Ambulatory Epigastric Hernia Repair Using Local Anaesthesia: A Pragmatic Approach In A Resource Poor Society.

E.A. Agbakwuru¹, A.C. Etonyeaku¹, A.A. Akinkuolie¹, A.O. Talabi¹, O. Olasehinde¹, A. Olekwu², A. Ojo³, I.O. Akingbade⁴.

¹Department of Surgery, Obafemi Awolowo Teaching Hospital Complex, Wesley Guilds Hospital Unit, Ilesa, Osun state, Nigeria.

²Department of Surgery Federal Medical Centre, Owo Ondo state, Nigeria.

³Department of Anaesthesia, Obafemi Awolowo Teaching Hospital Complex, Wesley Guilds Hospital Unit, Ilesa, Osun state, Nigeria.

⁴Department of Anaesthesia, Federal Medical Centre, Owo Ondo state, Nigeria.

Correspondence to: Etonyeaku, Amarachukwu C, Email: dretonyeaku@gmail.com

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Background: Epigastric hernia (EH) is not uncommon in clinical practice. Repair is often achieved using general anaesthesia (GA). We explored the tolerability and acceptability of EH repair using local anaesthesia (LA) in our patients.

Methods: Patients with EH, seen between April, 2007 and March, 2012; who were fit for ambulatory surgery and consented to use of LA for repair were recruited. Pentazocine or tramadol, diazepam and 0.5% xylocaine were used. Bio data, size of fascia defect, content of sac, and repair technique were entered into a spread sheet and was analyzed using the SPSS 17.0.

Results: Thirty patients were treated. Eighty percent were females. Painful lump (90%) and dyspepsia (30%) were common complaints. The mean diameter of the fascia defect was 3.3cm. The hernia sacs contained: pre-peritoneal fat (46.7%), the omentum (46.7%) or gut (6.6%). Seventy percent, 16.7%, 10% and 3.3% had repair using simple closure, Mayo, Keel and mesh hernioplasty techniques respectively. Early post-operative complications were surgical site infection (3.3%), seroma (3.3%) and haematoma (6.7%). Tolerability was excellent or good in 86.7% and the acceptance rate was 90%. Tolerability did not depend on the duration of hernia, size of defect, or duration of surgery. No recurrence was noted after a mean follow up period of 29.94months.

Conclusion: Ambulatory EH repair using LA is feasible and tolerable in well selected patients. Our patients preferred it to surgery using general anaesthesia.

Key words: hernia, epigastric, herniorrhaphy, local anaesthesia, ambulatory surgery.

Introduction

The true incidence of epigastric hernia (EH) in our environment is not known. Globally, divergent views on prevalence have been expressed as some consider it common¹ while others are of the opinion it is uncommon in clinical practice^{2, 3}. It appears to be neglected, perhaps giving rise to the low report rate. Attention is only paid to it when a painful often non-reducible swelling supervenes. Pain from the hernia may be mistaken for the dyspepsia and some patients may be on treatment for dyspepsia for a while before accurate diagnosis is made. Generally repair has been achieved using general anaesthesia⁴. There are reports on the success of EH repair using local anaesthesia^{5, 6}. Thus the prospect of day surgery using local anaesthesia was offered selected patients. This we found was not only exciting but acceptable to majority of the subjects.

We share our experience over a 5 - year period.

Patients and Methods

This was a prospective study of all cases of epigastric hernia done under local anaesthesia between April 2007 and March 2012 at the Obafemi Awolowo University Teaching Hospital Complex (Wesley Guilds Hospital Unit Ilesha), Osun state and the Federal Medical Centre Owo, Ondo state. They are both tertiary hospitals in south west Nigeria. The surgeries were done by surgeons in conjunction with the anaesthetics services. Ethical approval was obtained for the study. All consecutive patients with EH who consented to repair under local anaesthesia were recruited for the study.

The patients were first evaluated at the outpatient clinics for packed cell volume ≥ 30 , urinalysis negative for glucose, and absent or controlled co-morbid medical conditions like hypertension, diabetes, chronic obstructive pulmonary disease (COPD) and bladder outlet obstruction. All patients were treated purely on day case (ambulatory) surgery basis. Under aseptic technique in the operating theatre, skin was prepared with cetrimide and methylated spirit. Parenteral (intra-muscular/ intra-venous) pentazocine (30mg) or tramadol 50mg, and diazepam 5-10mg (100 μ g/kg; not exceeding 10mg) were given as premedication. Elderly patients and those with controlled pre-morbid medical conditions had tramadol while others were given pentazocine. Thereafter, 0.5% xylocaine administered along line of proposed incision (transverse or vertical), centered on the mass, from skin to fascia and, around and within the sac. Patients who could not tolerate LA had augmentation of anaesthesia (escalated anaesthesia) using 50-100mg ketamine (as analgesic dose). Fascia defects were repaired primarily either using size '0' or '1' nylon suture (as simple continuous suturing, Mayo or Keel techniques) or size '2/0' nylon 'running' stitch to anchor a polypropylene mesh. The peritoneum and sub-cutaneous tissue were closed with either size 2/0 chromic catgut or 2/0 vicryl; while the skin incision was closed using 2/0 nylon suture. Hernia defects ≥ 5 cm were offered mesh repair of defect. Those who could not afford mesh repair had one of the other three repair techniques subject to the preference of the attending surgeon. Post repair patients were observed in the recovery room for at least 2 hours before discharge home on analgesics.

They were seen a week later at the out-patient clinic, and were followed up for a minimum of 24 months evaluating for any evidence of pain at operation site, abnormal scar or recurrence. Tolerability was classified as excellent if patient was comfortable throughout the procedure; good if there was minimal discomfort; fair if there was significant discomfort but not sufficient to convert to general anaesthesia (GA) and poor if one had to revert to GA. Acceptability was taken as patient's tendency to consent to the procedure if given a second chance (i.e. given the privilege of hindsight would the patient have agreed to this technique in the first instance?). Acceptability and Tolerability was scored on a scale of 0 (poor) to 4 (excellent). All cases done were entered into a spread sheet from which data on age, gender, presenting complaint(s), size of fascia defect, content of hernia, repair technique, volume of anaesthetic agent used, duration of procedure and post operative complication(s) were extracted.

Data was analyzed using the SPSS 17.0 package for frequencies, measure of central tendencies and statistical relationships ('p' values).

Results

A total of forty eight patients with EH were seen by the two units during the study period. Only thirty of them consented to repair using local anaesthesia on an ambulatory surgery basis. This represented 3.3% of all anterior abdominal wall hernia repair done in both centres within the stated period. Eighty percent were females; and all were multiparous. Fifty percent of patients had normal body mass index (BMI) values (Table 1); while majority of the patients were either

farmers or traders (Table 1). The age of patients ranged from 24-79years (mean= 54.8years, SD ± 13.71), Table 1. Ninety percent of cases presented on account of a solitary epigastric lump while 10% were multiple. Painful lump was the reason for presentation in 90% of cases. The duration of hernia ranged from 0.25- 30years (mean=1.93years, SD ± 0.785) Table 1. There was dyspepsia in about 30% of the patients for which 30% of them had been on empirical treatment for peptic ulcer disease. Twenty to eighty millilitres of xylocaine (mean=45.2mls, SD ± 15.73) was used per patient.

Table 1. Gender distribution of BMI, Age, Occupation, duration of disease at presentation and content of hernia sac

Variable	Gender		Total
	Male	Female	N (%)
BMI			
≤ 25	4	11	15 (50)
26-30	2	9	11 (36.7)
31-35	0	4	4 (13.3)
Age Group (Years)			
<46	0	5	5 (16.6)
46-64	2	15	17 (56.7)
>64	4	4	8 (26.7)
Occupation of Patients			
Public servant	0	4	4 (13.3)
Farmer	6	6	12 (40)
Student	0	1	1(3.3)
Teacher	0	4	4 (13.3)
Trader	0	8	8 (26.7)
Tailor	0	1	1(3.30)
Duration of Hernias (Years)			
<1	4	5	9 (30)
1-5	2	13	15 (50)
6-20	0	5	5 (16.7)
>20	0	1	1(3.3)
Content of Hernia Sac			
Pre-peritoneal fat	3	11	14 (46.7)
Omentum	3	11	14 (46.7)
Gut	0	2	2 (6.6)

Table 2. Size of defect

Gender	Widest Diameter of Defect(cm)							Total
	1	2	3	4	5	6	8	
Male	0	1	2	3	0	0	0	6
Female	1	6	9	5	1	1	1	24
Total	1	7	11	8	1	1	1	30

Table 3. Level of Tolerance to Procedure

Tolerability	Frequency	Percentage
Excellent	6	20
Good	20	66.7
Fair	3	10
Poor	1	3.3

Table 4. Acceptability of the procedure

Will you accepted similar technique if need arises	Frequency	Percentage
Strongly agree	10	33.3
Agree	17	56.7
Not sure	2	6.7
Never	1	3.3

Table 5. p value Relationship Between Variables

	Duration of hernia	Widest diameter of defect	Content of sac	Duration of surgery
Tolerance	0.626	0.296	0.514	0.787
Post operative complication	0.743	0.678	0.812	0.988
Quantity of xylocaine used	0.271	0.887	0.734	0.310
Duration of surgery	0.843	0.159	0.063	

p values ≤ 0.05 accepted as significant

In 76.7% and 23.3% of cases, the defect was in the midline or just lateral to it respectively. The mean diameter of the fascia defect was 3.3cm (Table 2). The hernia contents encountered were: pre-peritoneal fat (46.7%), the greater omentum (46.7%) and guts (6.6%), Table1. One of the latter contained the transverse colon. Seventy percent, 16.7%, 10% and 3.3% had fascia closure using simple continuous suturing, Mayo, Keel and mesh hernioplasty techniques respectively. The surgery lasted between 20minutes and 80minutes (mean=56.87minutes SD $\pm$ 15.631). only one patient (3.3%) required augmented (escalated) anaesthesia.

The follow up period ranged from 24-60months (mean= 29.94months). There are no evidences of recurrence so far in the patients. There was 13.3% morbidity rate and no mortality amongst subjects. Complications encountered were single case each of surgical site infection (3.3%), seroma (3.3%), and chronic pain at operation site (3.3%). Two patients (6.7%) had haematoma at the surgical wound site, while three of our patients had hypertrophic scars (10%). Tolerability was excellent or good in 86.7% (Table 3) and the acceptance rate was 90% amongst subjects (Table 4). We observed that tolerance was not dependent on the duration of the hernia, size of the defect, content of sac or duration of surgery. Similarly, there was no statistically significant relationship between post operative complications and duration of hernia at presentation, or duration of surgery (Table 5)

Discussion:

Epigastric hernia (EH) occurs as a result of defect in the anterior abdominal wall from region of the xiphoid process to the umbilicus⁷. It is generally thought to be rare, occurring in about 3-5% of the general population⁸ and only about 0.4- 1.5% of all anterior abdominal wall hernias in middle aged individuals⁹. The aetiology is unclear as some consider it to be of congenital origin^{10, 11} while some are of the opinion that it is acquired¹². Several works have been done to evaluate the linea alba fibre morphology and bio-mechanics as probable predisposing factors, but evidences from these are rather inconclusive¹²⁻¹⁵.

Epigastric hernia may be single or multiple and some may just be off the midline. In our experience 76.7% occurred in the midline and only 10% were multiple. We observed that it was more common in women unlike reports from earlier works: where there was either male preponderance^{16,17} or equal frequency¹⁸. Risk factors for development of epigastric hernia include any cause of increased intra-abdominal pressure (pregnancy, ascites, straining at defaecation, micturition or work, intra- abdominal tumours) or factors affecting the integrity of the fibres of the linea alba or rectus sheath (obesity, previous surgery or nerve injury). Ammar et al¹⁶ reported that chronic liver disease was a probable cause in their series. Majority of our patients were not obese and were predominantly multiparous females suggesting that repeated pregnancy may have been probable risk factor. The males were middle aged or elderly and were all farmers suggesting that occupation and perhaps age were probable risks in them.

The size of the defect appeared larger in females probably because of the role of repeated pregnancy (increased intra-abdominal pressure), obesity, and longer duration of disease before presentation. EH can be asymptomatic, attention being drawn to it by pain from incarceration of the pre-peritoneal fat or contents of the hernia. The smaller the defect the more readily incarceration ensues and the more likely the patient presents early. Pain arising from EH is localized to the epigastrium and may present as dyspepsia mimicking peptic ulcer disease (PUD); this may explain why some of our patients had empirical treatment for PUD before diagnosis. The females also were noted to have the longer duration of illness at presentation; this may not be unconnected low socio-economic status and poor financial empowerment amongst this group. Majority may have to obtain approval from their husbands before seeking surgical care.

Previously in our hospitals, all patients with EH were admitted and had surgery done using general anaesthesia; the fear of which may have been responsible for patient's delay before presentation or acceptance of surgical correction. However, uncomplicated groin hernias were mostly repaired as day case procedures using local or regional anaesthetics techniques. Local anaesthesia has been shown to be effective, safe, easy to learn and apply, and cost efficient in the care of groin hernias¹⁹⁻²¹ and its use in EH has been reported by earlier investigators^{5, 6}. This informed our decision to introduce the practice into our service.

Our patients had premedication with parenteral pentazocine (or tramadol) and diazepam in a bid to effect pre-emptive analgesia which we hoped would aid tolerance of the procedure^{22, 23}. Pentazocine is believed to depress respiration hence our decision to avoid it in the elderly and those with co-morbid inter-current medical illness. Through the years different techniques for repair has been described or adapted²⁴⁻²⁶. The goal of surgery has always been to achieve a tension free repair; for which mesh plug or extra-peritoneal on-lay mesh would have been most appropriate^{20, 21, 26}. However, these were not readily available locally until recently; and when available, are quite expensive for the patients. Only one patient could afford an on-lay mesh; and in her it was imperative because she had an 8cm defect. She also had to receive intra-venous ketamine as she could not tolerate the procedure under local anaesthesia. Same patient had to be admitted for observation overnight; but was discharged within 24hours of surgery fully recovered from anaesthesia.

Minor complications following repair are not uncommon and may include seroma collection, haematoma, surgical site infection, long term pain and recurrence²⁷⁻²⁹. The complications we encountered were not unexpected: as the patients who had complications were either obese (BMI>30), had defect large >4cm or the duration of the disease > 5years. These we opine, made dissection a little more extensive. The surgical site infection was treated with antibiotic and wound dressing; the haematoma was drained by open technique, and the wounds healed by secondary intension; while the seroma was drained via needle aspiration. On the long run majority of the scars turned out fine. The longest surgery session was 80 minutes which is less than the expected duration of action of xylocaine (average 120minutes). This might explain why tolerance was not a function of duration of surgery. Different closure techniques were used based on the preference of the surgeon more over the study was aimed at establishing feasibility of the anaesthetic technique and the tolerability and acceptability of this approach rather than assessing the efficacy of the repair technique. Majority of our patients had simple closure technique and recording no recurrence after a 30 months follow up period may suggest that this technique is effective in our patients.

Conclusion

In resource poor settings with dearth of skill manpower (especially anaesthesia) and where judicious deployment of meagre resource is prudent, repair of EH using local anaesthetic techniques on ambulatory surgery basis offers a pragmatic option and is highly recommended in well selected patients. There is however a need to generate a population based data base for hernias in general to ascertain true incidence and probable epidemiological risk factors peculiar to our environment.

References

1. Ponten JE, Somers KY, Nienhuijs SW. Pathogenesis of the epigastric hernia. *Hernia*. 2012 Jul 24. [Epub ahead of print]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22824990> last accessed 24/11/2012.
2. Garba ES. Pattern of Adult External Abdominal Hernias in Zaria. *Nig J Surg Research*, 2000; 2(1): 12-15.
3. Tenaglia L, Iuppa A, Trovato S, Di Stefano C, Iuppa G, Minona E, Vacirca S, Scilletta S, Catania G. Our experience on the treatment of epigastric hernia. *G Chir*. 2008;29(10) : 417-20.
4. Corsale I., Palladino E. Diagnosis and treatment of epigastric hernia. Analysis of our experience. *Mierva Chir*. 2000; 55(9):607-610.
5. Brancato G, Privitera A, Donati M, Gandolfo L, Cavallaro G. Tension-free prosthetic repair in the surgical treatment of epigastric hernia. *Ann Ital Chir*. 2002;73(3):299-302; discussion 303.
6. Zuvella M, Milićević M, Galun D, Lekić NN, Bulajić P, Raznatović Z, Basarić D, Radak V, Palibrk I, Barović S, Petrović M. Ambulatory surgery of umbilical, epigastric and small incisional hernias: open preperitoneal flat mesh technique in local anaesthesia. *Acta Chir Iugosl*. 2006; 53(1):29-34.
7. Maurice E. Asuquo, Victor I.C. Nwagbara, Michael O. Ifere. Epigastric hernia presenting as a giant abdominal interparietal hernia. *Int J Surg Case Rep*. 2011; 2(8): 243-245.
8. Javid PJ, Brooks DC. Hernias. In: Zinner MJ, Ashley SW, eds. *Maingot's abdominal operations*. 11th ed. Vol. 1, New York: MacGraw-Hill Medical, 2007: 103-139
9. Arowolo O.A., Ogundiran T.O., Adebamowo C.A. Spontaneous epigastric hernia causing gastric outlet obstruction: a case report. *Afr J Med Sci*. 2006; 35(3):385-386.
10. Moschowitz AV. The pathogenesis and treatment of herniae of the linea alba. *Surg Gynecol Obstetric* 1914; 18:504.

11. Larson GM, Vandertoll MD. Approaches to repair of ventral hernia and full-thickness losses of the abdominal wall. *Surg Clin North Am* 1984; 64(2):335-49.
12. Askar OM. Aponeurotic hernias. Recent observations upon paraumbilical and epigastric hernias. *Surg Clin North Am* 1984; 64(2):315-33.
13. Lang B, Lau H, Lee F. Epigastric hernia and its etiology. *Hernia* 2002;6(3):148-50.
14. Korenkov M, Beckers A, Koebke J, et al. Biomechanical and morphological types of the linea alba and its possible role in the pathogenesis of midline incisional hernia. *Eur J Surg* 2001; 167:909-14.
15. Axer H, von Keyserlingk D, Prescher A. Collagen fibers in linea alba and rectus sheaths. *J Surg Res* 2001; 96:127-34.
16. Ammar S.A, Ismail T. Abdominal Wall Hernias in Upper Egypt: A Different Spectrum. *East and Central African Journal of Surgery*. Sept 2008, 13(2):109-113.
17. Conze J, Klinge U, Schumpelick V. Hernias. In: Holzheimer RG, Mannick JA, editors. *Surgical Treatment: Evidence-Based and Problem-Oriented*. Munich: Zuckschwerdt; 2001. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK6888/> last accessed 24/11/2012
18. Dabbas N, Adams K, Pearson K, Royle GT. Frequency of abdominal wall hernias: is classical teaching out of date? *J R Soc Med Sh Rep* 2011;2:5.
19. Agbakwuru E, Arigbabu AO, Akinola OD. Local anaesthesia in inguinal herniorrhaphy: our experience in Ile-Ife, Nigeria. *Cent Afr J Med*. 1995 Dec;41(12):405-9.
20. Kulacoglu H, Alptekin A. Current options in local anesthesia for groin hernia repairs. *Acta Chir lugosl*. 2011; 58(3):25-35.
21. Nordin P, Zetterström H, Gunnarsson U, Nilsson E. Local, regional, or general anaesthesia in groin hernia repair: multicentre randomised trial. *Lancet*. 2003 Sep 13; 362(9387):853-8.
22. Gottschalk A, Smith SD. New Concepts in Acute Pain Therapy: Preemptive Analgesia. *Am Fam Physician*. 2001 May 15; 63(10):1979-1985.
23. Dahl JB, Møiniche S. Pre-emptive analgesia. *Br Med Bull* (2004) 71 (1): 13-27. doi: 10.1093/bmb/ldh030
24. Mayo WJ. An operation for the radical cure of umbilical hernia. *Ann Surg* 1901; 34:276-80.
25. Bennett D. Incidence and management of primary abdominal wall hernias: umbilical epigastric and spigelian. In: Fitzgibbons RJ Jr, Greenburg AG, editors. *Nyhus and Condon's hernia*. 5th edition. Philadelphia: JB Lippincott co.; 2002. p. 389-98.
26. Muschaweck U. Umbilical and epigastric hernia repair. *Surg Clin N Am*. 2003; 83(5): 1207-1221.
27. Bisgaard T, Kehlet H, Bay-Nielsen M, Iversen MG, Rosenberg J, Jørgensen LN. A nationwide study on readmission, morbidity, and mortality after umbilical and epigastric herniarepair. *Hernia*. 2011 Oct; 15(5):541-6.
28. Helgstrand F, Rosenberg J, Kehlet H, Bisgaard T. Nationwide analysis of prolonged hospital stay and readmission after elective ventral hernia repair. *Dan Med Bull*. 2011 Oct;58(10):A4322.
29. Erritzøe-Jervild L, Christoffersen MW, Helgstrand F, Bisgaard T. Long-term complaints after elective repair for small umbilical or epigastric hernias. *Hernia*. 2012 Jul 14. [Epub ahead of print].