1. ABSTRACT
Background: Haemorrhoidectomy is a common surgical procedure which is usually associated with post-operative pain, bleeding, painful defecation, and anal stenosis. Stapled haemorrhoidopexy (SH) is associated with less pain than the conventional haemorrhoidectomy and can be used in the management of second, third and fourth degree haemorrhoidal disease. The objective of the study is to document the effectiveness of stapled haemorrhoidopexy as another method of treatment of haemorrhoids.

Methodology: This is a retrospective study carried out in a private health facility located in a high brow area of Lagos, Nigeria, from March 2010 to March 2015. The medical records of 46 patients who had stapled haemorrhoidopexy for symptomatic haemorrhoidal disease were evaluated. Data regarding complications, residual symptoms and recurrence were reviewed. The patients were followed up for a period 18 to 72 months.

Results: The study included 46 patients (36 men, 10 women), male: female ratio was 3.6:1. The ages were between 26 and 68 years old (median age 44 years). The average operating time was 25 minutes. The median hospital stay was 40 hours (11–72 hours). Complications observed included: postoperative bleeding in 5 patients (10.9%), urinary retention in three patients (6.5%), anal fissure in two patients (4.2%), and painful defecation in three patients (6.5%). One patient had significant secondary bleeding from the staple line that required blood transfusion. The average follow-up period was for 3 years. Three patients (6.5%) had a reoccurrence.

Conclusions: Even though stapled haemorrhoidopexy has complications similar to those of other surgical methods, its results present less postoperative pain, allowing early recovery and return to work. Studies with more cases and a longer follow-up are still necessary to assess the late recurrence.

Key words: stapled haemorrhoidopexy, complications, reoccurrence

2. Main Manuscript
Introduction
Haemorrhoids are one of the most common conditions encountered in general surgical clinics. Large numbers of patients who have haemorrhoids are asymptomatic. Bleeding during defecation is the most frequent presenting symptom. The haemorrhoids may prolapse (2nd to 4th degree) resulting in other symptoms; mucus seepage, pruritus, loss of discrimination and continence to flatus and occasional faecal incontinence. Several options are available for the treatment of symptomatic haemorrhoids, and most patients with low-degree internal haemorrhoids will have relief with home-based conservative treatment or office-based procedures. Surgery is indicated for low-degree haemorrhoids that are refractory to home- or office-based treatments, high-degree haemorrhoids, and complicated haemorrhoids. Surgical excision of haemorrhoids is effective in treating haemorrhoidal prolapse but is still feared by the patients, because of ensuing postoperative pain, which is usually worst during the passage of stool owing to direct contact with the wound and reactionary sphincter spasm.

The stapled haemorrhoidopexy procedure as described by Longo has been popularized as a painless and effective treatment for prolapsed haemorrhoidal disease. The stapling device excises a circumferential strip of the redundant mucosa-submucosa at the proximal aspect of the internal haemorrhoids above the dentate line thus avoiding a painful cutaneous wound. We conducted this study as no local data is available to assess the short and long term effects of stapled haemorrhoidopexy in our environment.

Methodology
All patients that presented between March,
2010 and March, 2015, were included in the study. Patients with thrombosis/ gangrenous internal or external haemorrhoids, those with presence of anal stenosis, perianal abscess and full thickness rectal prolapse were excluded.

All patients were subjected to a detailed pre-operative evaluation which included digital rectal examination and rigid sigmoidoscopy. Colonoscopy was carried out selectively in those patients who had a positive family history of colon cancer, who were older than 50 years of age or had concomitant anaemia. Colonoscopy was not done for all the patients on account of the cost. All patients were admitted on the day before proposed day of surgery and had enema saponis on the morning of surgery. The procedure was explained to the patient and consent obtained. Similarly the visual Analog Scale for recording post-operative surgical pain was explained to the patient and co-operation sought in recording it.

The operation was performed under general anaesthesia in 10 patients [22%] or spinal anaesthesia in 36 patients [78%]. The preferred anaesthesia is spinal and patients where spinal anaesthesia is contraindicated or the anaesthesia failed to institute spinal anaesthesia had general anaesthesia. The patients were placed in a prone-jack knife position after spinal anaesthesia while patients who had general anaesthesia were placed in lithotomy position. Once properly positioned, the anal canal was thoroughly examined for pathology other than haemorrhoids. A circular anal dilator (CAD 33; Ethicon Endo-Surgery, Inc.) was introduced to reduce the prolapse of the anoderm and parts of the anal mucous membrane. After removal of the obturator, the prolapsed mucous membrane fell into the lumen of the circular anal dilator. Then, a purse-string suture, non-absorbable, of 2-0 polypropylene (Prolene; Ethicon Inc.) was placed circumferentially 3-5 cm above the dentate line through the window of the purse-string suture anoscope (PSA 33; Ethicon Endo-Surgery Inc.). Subsequently, a haemorrhoidal circular stapler (HCS 33; Ethicon Endo-Surgery Inc.) was positioned and fired. Finally, a haemostatic endoanal dressing was applied.

Before extubation, the patient received a basic analgesia intravenously (30 mg of Pentazocine); patients who were operated on using spinal anaesthesia had 1% lidocaine hydrochloride topically.

The operation time was defined as the time from the insertion of the circular anal dilator until the application of the endoanal dressing. All patients received a normal diet postoperatively and were given lactulose or liquid paraffin for preventing hard stool. A pain score data sheet (Visual Analog Scale) was filled out by the patients' postoperatively (0 indicates no pain; and 10, maximum pain). Pain scores were evaluated 6 hours later, after 24 hours and subsequently daily by a surgeon. Post-operative pain therapy consisted of basic analgesia (Diclofenac Sodium) and addition of subcutaneous injections of Pentazocine hydrochloride, 30 mg every 6 hours, or on request. At discharge from the hospital, the patients receive lactulose 20 ml daily or 10 mls liquid paraffin twice daily, and a basic analgesia (Diclofenac). All specimen were sent for histology.

A follow-up examination was performed 3 and 12 weeks postoperatively. Postoperative complications (with special regards to rectal stenosis), defecation habit, frequency, and return to work postoperatively were evaluated. In addition, a 1-year follow up examination was also performed with special regard to haemorrhoid recurrence. At this examination, defecation habits were evaluated and a proctologic examination was performed.

We compared the degree of haemorrhoids and the complications observed. Data were analysed with Epi Info 3.4.3 (CDC, Atlanta Georgia). Results are expressed as mean and standard deviation for continuous normally distributed variables and median with range for non-normally distributed continuous variables. Chi-square or Fisher’s exact test was used to find the relationship between categorical variables. The study followed principles in the Declaration of Helsinki and was approved by the local ethics committee of the hospital.

RESULTS
A total of 46 patients with symptomatic late 2nd, 3rd and 4th degree haemorrhoids were enrolled in the study over a 5-year period. There were 36 males and 10 females (male: female ratio 3:6:1), with a median age of 44 years (range, 26–68 years). The predominant
The presenting symptom was bleeding per rectum (40 patients, 87%) (Table 1). This was followed in descending order by prolapse (30 patients, 65%), pruritus (15 patients, 32.6%), per-rectal discharge (10 patients, 21.7%), pain (5 patients, 10.2%) and constipation (3 patients, 6.5%). Regarding the degree of haemorrhoids, 32 patients (70%) had third-degree haemorrhoids, 11 patients had 2nd degree (23.9%) and three patients (6.5%) had 4th degree haemorrhoids. The duration of these symptoms ranged from 3 weeks to 30 years.

The average operation time was 25 minutes (range 15 minutes to 45 minutes). In two patients there was intra-operative technical difficulty in sheath placement, in 12 patients there was bleeding from the staple line, 10 of them required haemostatic sutures at bleeding sites and five patients (10.2%) required pressure packing for a few minutes to achieve haemostasis. Six patients had an incomplete doughnut (resected rectal mucosa came out with the stapled gun following resection and anastomosis).

During the immediate postoperative period, 5 patients (10.9%) developed overt per rectal bleeding while in the recovery room. (Table 3) Review of their operative notes showed that of these, 4 had significant intraoperative staple line bleeding necessitating suture haemostasis, and 1 did not have any bleeding intraoperatively. Two patients were eventually brought back to the operating room for surgical haemostasis. These two had developed rectal bleeding while in the ward. Examination of all four patients under anaesthesia showed that bleeding originated from the staple line. This was controlled by further placement of haemostatic sutures. Following discharge, one of the five patients described above was readmitted after developing profuse per rectal bleeding on the sixth postoperative day. Examination in the operating room under anaesthesia revealed secondary haemorrhage from the staple line and the rectal mucosa overlaying the haemorrhoid. Review of this patient’s records showed that there had been staple line bleeding requiring suture haemostasis as well as immediate postoperative bleeding per rectum that stopped spontaneously while in the recovery room.

Figure 1 is a bar chart showing the postoperative pain experienced by the patients. Majority of the patients (84.8%) experienced no pain or mild pain after 6 hours. None of the patients had severe/ grade 3 pain. After 24 hours of surgery four patients required Pentazocine Hydrochloride, eight required Diclofenac Sodium 75mg, and eighteen required Diclofenac Sodium 50mg. All the patients were discharged with diclofenac 50 mg to take as required, but not more than twice a day. In five patients secondary haemorrhage occurred which was managed conservatively, five patients developed urinary retention, three of them required temporary catheterization, two patients suffered from superficial anal fissure which was managed with 0.2% glyceryl trinitrate (GTN) ointment, five had painful defecation managed by regular analgesic use and stool softeners.

Postoperatively, forty patients stayed in hospital for less than two days, the other patients were discharged before the 4th day. Two of them still required analgesics while two stayed in the hospital for family reasons. Most

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding per rectum</td>
<td>40</td>
<td>87%</td>
</tr>
<tr>
<td>Mucosal prolapse</td>
<td>30</td>
<td>65.2%</td>
</tr>
<tr>
<td>Pruritus ani</td>
<td>15</td>
<td>32.6%</td>
</tr>
<tr>
<td>Peri rectal discharge</td>
<td>10</td>
<td>21.7%</td>
</tr>
<tr>
<td>Anal pain</td>
<td>5</td>
<td>10.9%</td>
</tr>
<tr>
<td>Constipation</td>
<td>3</td>
<td>6.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree</th>
<th>No of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>2nd</td>
<td>11</td>
<td>23.9%</td>
</tr>
<tr>
<td>3rd</td>
<td>32</td>
<td>69.6%</td>
</tr>
<tr>
<td>4th</td>
<td>3</td>
<td>6.5%</td>
</tr>
</tbody>
</table>
patients were satisfied by virtue of less postoperative pain, minimal hospital stay and early return to normal activity. Thirty-six patients were ready to return to their routine work in seven days. Two patients developed constipation and were readmitted with faecal impaction.

One patient had a suture line dehiscence on the third postoperative day due device malfunction with significant rectal bleeding that required transfusion with 2 units of blood. She had an excision haemorrhoidectomy (Milligan Morgan haemorrhoidectomy). At surgery, few staples were observed at the suture line. Three patients had re-occurrence of symptoms after one year of follow-up, one patient was treated with banding while the other two patients opted for excision haemorrhoidectomy though they could have been managed with banding. Two of the patients initially complained of faecal urgency a few weeks after the procedure which resolved after a few weeks. None of the patients complained of chronic anal pain, strictures, fistulas or intramural abscess.

Discussion
Haemorrhoids are equally distributed in men and women, and the incidence increases with age.⁸ Our study group consisted of middle-aged individuals with men outnumbering women. The possible explanation may be that women are less forthcoming with the problems involving the perineal area. The patients in our study presented with a long median duration of twenty-six months. They often choose to ignore the intermittent episodes of painless bleeding per rectum to avoid or treat it conservatively with local medication. They seek medical advice only when the symptoms become exaggerated.

In our study, thirty patients (65%) were pain free within the first 24 hours, which is comparable with studies performed worldwide, which ranged from absent to mild and moderate degrees.⁵,⁷ Only three patients (6.5%) had moderate pain which was controlled on routine analgesic use and none of the patients had severe pain. Pain is very variable from one patient to another and is very difficult to quantify. The intensity of the pain also varies with the cultural context. Plausible explanations for the postoperative pain after stapled haemorrhoidopexy in some cases include reduction of vascular supply to the haemorrhoids, thrombosis of the haemorrhoidal tissue left behind after the operation, placement of staple line too close to sensitive anal mucosa and placement of deep purse string incorporating rectal muscle and nerves resulting in postoperative pain.⁹ Persistent post defecation pain has been confirmed as a genuine complication of circular stapled haemorrhoidopexy in some cases include reduction of vascular supply to the haemorrhoids, thrombosis of the haemorrhoidal tissue left behind after the operation, placement of staple line too close to sensitive anal mucosa and placement of deep purse string incorporating rectal muscle and nerves resulting in postoperative pain.⁹

Table 3. Postoperative outcome parameters

<table>
<thead>
<tr>
<th></th>
<th>Post-Op admission</th>
<th>3-weeks follow-up</th>
<th>3-months follow up</th>
<th>1-yr follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative bleeding</td>
<td>(10.9%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
</tr>
<tr>
<td>Re occurrence</td>
<td>(6.5%)</td>
<td>1 patient (2.2%)</td>
<td>None (0%)</td>
<td>2 patients (4.3%)</td>
</tr>
<tr>
<td>Faecal urgency</td>
<td>(4.3%)</td>
<td>2 patients (4.3%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
</tr>
<tr>
<td>Urinary retention</td>
<td>(6.5%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
</tr>
<tr>
<td>Anal fissure</td>
<td>(4.3%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
</tr>
<tr>
<td>Chronic anal pain</td>
<td>(0%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
</tr>
<tr>
<td>Incontinence to flatus</td>
<td>(0%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
<td>None (0%)</td>
</tr>
</tbody>
</table>

Figure 1. Postoperative pain score

![Postoperative Pain (VAS Score)](image)

No Pain | Mild Pain | Moderate Pain | Severe pain

Postoperative bleeding is a common reported complication and occurred in five of our patients (10.9%). This is comparable with what is obtained in the literature. Bleeding following stapled haemorrhoidopexy is said to most commonly occur immediately after surgery or

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from day 7 onwards. Our results were in line with previous studies conducted by Mumtaz et al. that reported an 11.1%, and Hetzer et al. who reported a 10% incidence of staple line bleeding, with various reasons put forth.\textsuperscript{10, 11} When the stapler is deployed in an intact bowel lumen during the Longo technique, the stapler actually cuts across well-vascularized tissue, including submucosal blood vessels, under relatively high pressure. The rectal wall is notoriously vascular, with vessels situated just beneath the mucosa. Similar intraoperative bleeding results have been noted by Manfredelli et al. who observed a high percentage of staple line bleeding compared to an open group.\textsuperscript{12} In this study, most of the staple line bleeding was from an active arterial spurt that was managed by electrocautery initially and, if deemed necessary, was controlled by suture re-enforcement by a figure-of-eight suture. In the others bleeding was oozing and were managed by gauze impregnated with adrenaline and gauze packing. We conclude that it is imperative to review the staple line after completion of the procedure to avoid any bothersome aftereffects from bleeding at the suture line.

Faecal urgency was noticed in two patients (4.3%) within the 1st two months of surgery but resolved on follow up at six months. Early faecal urgency was reported by Giordano et al. (7.1%) and rates in the literature ranged from 0 to 25%.\textsuperscript{13, 14} Early constipation is common hence the use of laxatives postoperatively. Two patients (4.3%) had faecal impaction and no case of faecal incontinence was observed. These two patients had constipation prior to surgery and were not taking adequate stool softeners. It however settled on regular analgesic use and stool softeners. They had manual dis-impaction under anaesthesia. It is postulated that excessive anal dilatation can also contribute to its development, as well as the presence of submucosa and muscularis mucosa in the resected tissue and anastomotic denervation secondary to pelvic dissection and removal of proximal rectum and mesorectum.\textsuperscript{15}

Acute urinary retention is common after stapled haemorrhoidopexy and occurred in three patients (6.5%). This is similar to the 9.1% obtained by Muhammad et al.\textsuperscript{16} Acute retention results from combination of anaesthesia, post-operative pain and anxiety. We believed that the retention observed in our series is likely due to spinal anaesthesia as it did not occur in patients who had general anaesthesia. After, a trial of conservative methods these patients require temporary catheterization, which can be successfully removed after a few hours. Delayed urinary retention following the surgery associated with fever is an ominous sign that indicate pelvic sepsis.\textsuperscript{17}

Recurrence of haemorrhoids following the procedure is well documented in the literature and could be as high as 58.9% of patients, with a median recurrence rate of 6.9%.\textsuperscript{7, 18} Three of our patients (6.5%) had recurrence of their symptoms. One of them was the patient with postoperative bleeding requiring blood transfusion and had her open haemorrhoidectomy about a month after the stapled haemorrhoidopexy. The staples were not observed at the staple line at surgery. Defective stapling is a unique risk associated with stapled haemorrhoidopexy that has been shown most often to occur secondary to technical errors or problems with materials. Giordano et al. reported a 13% recurrence rate at 3 years.\textsuperscript{13}

Complications including anastomotic dehiscence have been reported secondary to the use of a defective stapler, along with incomplete stapling.\textsuperscript{14, 17, 18} Routine checking of the staplers prior to the commencement of surgery has been recommended.\textsuperscript{14, 18} The most serious complication of stapled haemorrhoidopexy is anastomotic dehiscence, though rare, its early diagnosis is important, as the resulting sepsis can be life threatening. Management may include laparotomy, peritoneal lavage, anastomotic repair and defunctioning colostomy. Other complications are rectal perforation, retroperitoneal sepsis, rectal obstruction and even mortality.\textsuperscript{19} None of these serious complications occurred in our group of patients.

The rate of residual skin tags and recurrence has been shown to be considerably higher than other methods of haemorrhoidectomy, but in line with the rates seen in rubber band ligation.\textsuperscript{20, 21} Residual skin tags have been suggested to shrink in size following stapled haemorrhoidopexy, although many studies do not support this finding.\textsuperscript{22}
Other rare postoperative complications after stapled haemorrhoidopexy have been reported that reflect a combination of learning curve and incorrect patient selection including rectovaginal fistula formation, which can be avoided by assessing the thickness of rectovaginal septum before inserting the purse string suture. Care should be taken not to place too deep a suture anteriorly during the placement of the purse string and the vagina must be examined before firing the stapler. Anorectal stricture formation is also a known complication after stapled haemorrhoidopexy with a reported incidence of about 5%, it has been postulated that occurrence of stricture is due to the placement of the purse string and thus anastomosis below the accepted 4cm from the anal verge. Simple stricturoplasty or anal dilatation is all that is necessary for the treatment of anorectal stricture formation after stapled haemorrhoidopexy.

We acknowledge that the study has a number of limitations. The rather small number of patients included in our study and its retrospective nature limits the interpretation of the results. The small sample reflects the difficulty at obtaining long-term follow-up results after surgery for haemorrhoids in our midst. In addition, the retrospective nature of this study may undermine the formation of comparable groups regarding features such as recurrence, degree of haemorrhoid disease, and type of surgery. The authors agree that there is need to compare this result with excisional haemorrhoidectomy which is the gold standard for the treatment of haemorrhoids in this environment. The procedure is much more expensive than the excision haemorrhoidectomy which limits the number of patients who can benefit from the procedure. To our knowledge, this is the first publication of experience with stapled haemorrhoidopexy from Nigeria and it is our hope that with the improving economic situation, many patients will benefit from this procedure.

**Conclusion**

Stapled haemorrhoidopexy is a valid alternative to treat patients with haemorrhoids in 2nd to 4th degree haemorrhoids. Its main benefits are little postoperative pain and early return of the patient to daily activities. Studies involving more cases and with longer follow-up are still necessary to assess late recurrence. Stapled haemorrhoidopexy is an acceptable treatment for haemorrhoids due to shorter healing process and less pain.

**DECLARATION OF INTEREST:** The authors report no conflict of interest

**References**


