

Outcomes of the Management of Giant Inguinoscrotal Hernias in Rural Areas in Cameroon

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Copyright © 2025 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0). http://creativecommons.org/licenses/by/4.0/ Abstract

Introduction: Inguinal hernia is one of the most common surgical operations world-wide accounting for 10% - 15% of all surgical procedures. Giant inguinoscrotal hernias (GISH) have been defined as those that extend below the midpoint of the inner thigh when the patient is in the standing position. Its management represents a challenge due to the risk of developing abdominal compartment syndrome (ACS). This study is set out to describe the experience of ASCOVIME in the management of GISH in the rural areas of Cameroon. Materials and Methods: We conducted a descriptive cross-sectional study in the rural areas of the ten regions of Cameroon within 13 years (February 2011 to August 2024). Sampling included patients operated for GISH. The patients were recruited during ASCOVIME health campaigns and operated in a local health centre/district hospital by the ASCOVIME team and the local team. Postoperative follow up was done by the local team. Patients were follow up for at least 3 years following the surgery. End points to stop follow up were defined as a recurrence or at least 5 years, whichever occurs first. Results: GISH represented 0.39% of the surgical activities and 0.69% of groin hernias. We included 62 cases with a male predominance; sex ratio 11:1. The average age was 54.7 ± 1.1 [34 - 79] years. Majority of the participants were farmers (66%). Those with the sac between the midthigh and supra-patellar line were the most frequent 30 (48.3%). All declared having an altered quality of life with more than 38 (58%) feeling rejected by their communities. More than half of the participants, 55 (88.7%) had a hernia that was spontaneously or manually reducible. This was a major criterion to determine operability in rural zones to avoid complications. Lichtenstein was the most practised technique 56.5% (35). Bowel resection in 22.6% (14 cases) related to partially reducible or irreducible cases where tough adhesions and oedematous viscera caused inevitable bowel injury during surgery and bleeding with sometimes the need for blood transfusion. We recorded 2 cases (3.2%) of ACS with a case fatality rate of 3.2%. **Conclusion:** GISH is a reality in our community. It is frequent in rural areas where populations are involved mainly in land ploughing activities. This condition impacts heavily social integration which can go right up to rejection. Its treatment relies on surgery, depending on the reducibility; the corner stone in determining the possibility of surgery in rural areas with minimal risk of complication. Application of appropriate management orientation for the individual patients is the key to successful treatment.

Keywords

Giant Inguino-Scrotal Hernia, Rural Setting, Surgical Management, Outcome

1. Introduction

Inguinal hernia is one of the most common surgical operations done world-wide accounting for 10% - 15% of all surgical procedures [1]. In Africa the incidence of inguinal hernia is estimated to be 175 per 100.000 people and only 40% are operated [2]. In Cameroon, a study published in 2019 that was done in the south west of Cameroon, estimates prevalence to be 7.4 cases of hernia symptoms per 1000 persons with groin hernias representing 85% of all hernias [3].

Giant inguinoscrotal hernias (GISH) have been defined as those that extend below the midpoint of the inner thigh when the patient is in the standing position or should display an anteroposterior diameter of at least 30 cm or a latero-lateral diameter of about 50 cm with non-reducibility for more than 10 years [4]. They result from neglect and fear of the surgical procedure or lack of means. Its management represents a challenge due to the risk of developing abdominal compartment syndrome (ACS [5]. The large size and chronicity of the hernia, associated with deranged mechanical properties of the abdominal wall, makes the management of these cases unique and interesting [6]. There is no standard procedure for treatment of this condition and literature describes several treatment strategies; the Goni Moreno (Preoperative Progressive Pneumoperitoneum) technique amongst others, has been highly recommended in the past [7] [8], but usually it causes expansion of the thin hernia sac rather than the contracted abdominal cavity, thus revealing its limits [9]. This affection greatly alters patients' quality of life, including difficulties with mobility, bowel obstruction and enlarged scrotal skin sometimes with ulceration. The social impact is significant; it can cause social isolation, fear of seeking medical attention, and subsequent worsening of the condition [10].

In high-income countries, the diagnosis of inguinal hernia is usually made early, when the patient notices the development of swelling or groin pain [11]. Given the potential of hernia strangulation, surgical correction is often carried out without delay. Consequently, giant inguinoscrotal hernias have become extremely rare in Europe and Asia [12] [13] and are currently seen in clinical practice only after years or even decades of self-neglect [14]. In Africa due to social isolation, fear of seeking care and poverty; these hernias are still common especially in rural communities; however, their incidence and prevalence are not known. Recent observational studies in the last decade; 134 cases were reported in a study in Nigeria in 2010 and 30 cases were reported in Ivory Coast, 103 cases in Sierra Leone [15]-[17].

In Cameroon, there is no study on the burden of this condition, thus the authors set out to describe the outcome following surgery of GISH in rural Cameroon.

2. Materials and Methods

Study design and participants selection: A descriptive cross-sectional study was carried out for 13 years between January 2011 and August 2024 in rural areas in all the 10 regions of Cameroon. Participants came from the following villages across the 10 regions: Tibati and Sambolambo in the Adamawa; Afanayo, Bikop, Evodoula, Minta, Ngouantet, Nkolmebanga, Mpagne in the centre region; Bogo, Datcheka, Kalfou, Yagoua, Kongola in the Far North Region; Meloundou, Mindourou, Abong bang in the East region; Moya, Nkongsamba in the littoral, Bangou, Bazou, Didango, Foumban, Bassamba, Babouatou in the west, Ambam, Avebe, Mekas, Meyomadjom, Mpolongwe, Ngoanzip, Nkolebo'o, Nkoulganga in the south, Guider, Demsa, Gachiga in the north; Belo, Fundong in the north west and Nguti in the South West region.

We recruited patients operated for GISH during ASCOVIME (Association des Competences pour une Vie Meilleure) health campaigns. All patients had been operated on by an experienced visceral surgeon from ASCOVIME team. The surgical procedure included an inguinal approach, reintegration of the hernia contents, followed by dissection and partial or complete resection of the sac. Herniorrhaphy was performed according to Shouldice or Bassini, and hernioplasty by the placement of a polyester prosthesis according to the Lichtenstein procedure. A scrotal suction drain was left in position for a period of 4 to 5 days. Follow up was assured by the local team. The short term follow up was done for 30 days following the procedure and the long term follow up included evaluation at 6 months, 1 year, 3 years and 5 years following surgery. We included all patients over 18 years old with GISH operated in these rural areas that consented in participating to the study. We excluded patients with less than 3 years of follow-up and those lost to follow-up, as well as patients with important comorbidities. All the pictures were taken during ASCOVIME health campaigns, and patient consent was obtained for their use in the study (Figures 1-9).

The variables studied were socio-demographic (age, sex, region) clinical (symptomatology, number of years of evolution), surgical (operative procedure, findings), postoperative outcomes (complications, recurrence) as well as quality of life.



Figure 1. Congenital large inguino-scrotal hernia in a seven-year-old boy (excluded); cases usually neglected which usually evolve into GISH later on.



Figure 2. Patient excluded as bottom of sac does not reach the inner mid-thigh.

Ethical and administrative considerations: Administrative approval was obtained from the president of ASCOVIME followed by ethical approval from the ethical committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaounde1. Patients who consented to the study were then enrolled. The principles of ethics in research were duly respected.

3. Results

3.1. Participants Selection

During the 13 years period, 17,567 patients had surgical indications, out of which 90.4% (n = 15,893) were actually operated on. Abdominal wall hernias represented 61.4% (n = 9754) of the cases with 92% (n = 8981) being groin hernias. There were 68 cases of giant inguinoscrotal hernias of which 62 underwent surgery representing 0.39% of surgical activities and 0.69% of groin hernia.

3.2. Socio-Demographic and Clinical Parameters (Table 1)

The patients came from all over Cameroon with most of the patients coming from

Parameter	Frequency	Proportion
	(n = 62)	(%)
Sex distribution		
Male	57	92
Female	5	8
Profession		
Farmers	41	66
Hunters	17	28
Others	04	6
Comorbidities		
Hypertension	22	35.5
Diabetes	11	17.7
Smoking	29	46.8
Alcohol	44	71.0
COPD	08	12.9
LUTs	22	35.5
Chronic constipation	21	33.9
HIV	01	1.6
Hepatitis B	03	4.8
Hepatitis C	01	1.6
Reducibility		
Spontaneous reduction	13	21
Complete manual reduction by personnel or patient	42	67.7
Incomplete manual reduction by personnel or patient	04	6.5
More than 1/2 of the sac remaining despite reduction	03	4.8

Table 1. Sociodemographic and clinical parameters.



Figure 3. GISH with sac reaching the mid-inner thigh (*Pictures taken during ASCOVIME campaign with permission from the participants*).



Figure 4. GISH with bottom of sac between mid-thigh and supra-patellar line (*Pictures taken during ASCOVIME campaign with permission from the participants*).



Figure 5. GISH with sac at supra-patellar line (*Pictures taken during ASCOVIME campaign with permission from the participants*).



Figure 6. Sac passes over the supra-patellar line, or other types associated to another hernia (contro-lateral inguinal, femoral or umbilical). (a) Isolated form; (b) Associated to bilateral femoral hernias, using our proposed classification (*Pictures taken during ASCOVIME campaign with permission from the participants*).



Figure 7. Aspect of the scrotum after pre-operative manual reduction.

the East region (30.6%, n = 19). There was a male predominance of 57 males to 5 females giving a sex ratio 11:1. The average age was 54.7 ± 1.1 years with a range of 34 - 79 years. All the participants were from rural areas and were involved in physical activities as a source of livelihood, the majority (66%) being farmers. Those with the sac between the midthigh and supra-patellar line were the most frequent n = 30 (48.3%). Among the patients, 71% (n = 44) consumed alcohol regularly, almost half were smokers and about 1/3 of the participants had hypertension. More than half of our population n = 55 (88.7%) had hernia that was either spontaneously or manually reducible, all those with sac either at mid-inner thigh or between mid-thigh and suprapatellar line.

The average duration of evolution was 30.8 ± 0.7 years ranging between 14 and 50 years. Congenital hernia was found in 4 (6.4%) participants. Amongst those with acquired hernia, the average length of evolution was 30.8 ± 0.7 years ranging between 14 and 50 years. Cases of recurrences were in n = 13 participants with a

variation in the time lapse since previous intervention being 5 to 27 years with an average of 16 ± 1.1 years.

3.3. Management

3.3.1. Anesthesia

According to the physical status scale of American Society of Anaesthesiologists (ASA class) majority of the patients were ASA I, n = 18 (29.0%) and ASA II, n = 28 (45.2%). The main type of anesthesia used was spinal in 58% (n = 36) of the participants and general anesthesia in 39% (n = 24) of the participants whereas in 18% (n = 11) of the participants there was conversion from locoregional to general anesthesia.

3.3.2. Surgery (Table 2)

The approach was anterior approach by an incision in the groin in the lower abdominal fold in all the patients. Findings in the majority of cases were a fused spermatic cord 83.9% (n = 52) with an oedematous omentum 77.4% (n = 48). The content of the sac varies from omentum to bowel and to colon with the omentum and small bowel being present in the majority of cases.



Figure 8. GISH with bottom of sac reaching the supra-patellar line before and during surgery; cord-sac dissection (*Pictures taken during ASCOVIME campaign with permission from the participants*).



Figure 9. Per-operative sac dissection with visualisation of hernia neck.

Orchidectomy was performed in half of the population n = 32 (51.6%). Shouldice repair was done in 37% (n = 23) of the participants and Lichtenstein was done in 56.5% (n = 35) of the participants. In 29.0% (n = 18) of the participants an initial Shouldice repair was done which was later converted to Lichtenstein. This conversion from Shouldice to Lichtenstein was done 6 months later.

Shouldice technique was used following bowel resection in 22.6% (n = 14) of the cases of which 8 small bowel segmental resection and 6 colectomies. A scrotal drain was used in 2 cases; a compressive bandage was left in place for all the other cases.

Description	Frequency $(n = 62)$	Percentage (%)
Findings and sac description.		
Fused spermatic cord	52	83.9
Sac length is greater than 30 cm	41	66.1
Hidden testis	47	75.8
Oedematous omentum	48	77.4
Entero-scrotal fistula	01	1.6
Thickened sac wall	62	100.0
Contents of the sac		
Omentum only	20	32.3
Small bowel, caecum and omentum	26	42
Right Colon and omentum	12	19.4
Right colon, small bowel and omentum	3	4.8
Sigmoid colon	1	1.5
Associated procedures		
Omentectomy	12	19.4
Segmental bowel resection	8	13
Right colectomy	6	9.7
Orchidectomy	32	51.6
Contralateral hernia repair	04	6.5
Technique of repair		
Shouldice	23	37
Bassini	04	6.4
Lichtenstein	35	56.5
Shouldice then Lichtenstein	18	29

Table 2. Sac content, technique of repair and associated procedures.

3.4. Outcome (Table 3 and Table 4)

Morbidity: The main per operative complications were bowel injury in 9.7% (n = 6) of the cases and bladder injury in 1.6% (n = 1) of the cases. Bladder injury was

treated by suture and insitu urinary catheter kept for 10 days meanwhile, bowel injuries were treated by resection and anastomosis.

We recorded only 2 cases (3.2%) of abdominal compartment syndrome; Pain occurred in a short run in n = 18 (29%) patients and persisted only in n = 6 (9.7%) patients after follow up. We equally had n = 15 (24.2%) cases of seroma and n = 2 (3.2%) cases of surgical site infection. Urinary retention occurred in n = 16 (25.8%) patients resolved spontaneously after a one-time transurethral catheterization. There was no case of recurrence after 3 years.

Description	Frequency (n = 62)	Percentage (%)
Per-operative complications		
Bladder injury	01	1.6
Small bowel injury	06	9.7
30-days post-operative complications		
Pain	18	29
Abdominal compartment syndrome	02	3.2
Urine retention	16	25.8
Seroma	15	24.2
Surgical site infection	02	3.2
Death	02	3.2
Long term complications (3 years)		
Recurrence	00	00
Chronic Pain	06	9.7
Testicular atrophy	07	11.3

Table 3. Evaluation of short- and long-term outcome after surgery.

We recorded a Case fatality rate (CFR) of 3.2%, the two cases of death in the post-operative period from abdominal compartment syndrome (patient with sac extending below the patella) and perioperative bleeding (patient with bottom of sac ending at supra-patellaar line).

3.5. Impact on Quality of Life (QoL) before and after Surgery (Figure 10)

All the participants had an altered gait with development of new patterns of movement. All the participants admitted having their sexual activities altered. After surgery, all patients declared to have an improvement in quality of life especially concerning sexual activities, daily chores, dressing and acceptance by the community.

The level of alteration of sexual activities was further evaluated and two of the participants with congenital inguinoscrotal hernia (all with sac below the patella) admitted no sexual activities since birth.



Assessment of quality of life before and after surgery

Figure 10. Assessment of Quality of life (QoL) of the participants before and after surgery.

Hernia characteristic	Reducibility	Bowel resection	Blood transfusion	30 days complication	Death
Bottom of sac at mid inner thigh (n = 25)	25 (100%)	00	00	12 (48%)	00
Bottom of sac between mid-inner thigh and supra-patellar line (n = 30)	30 (100%)	07 (23.3%)	03 (10%)	10 (33.3%)	00
Botton of sac at supra-patellar line (n = 5)	00	05 (100%)	05 (100%)	04 (80%)	01 (20%)
Bottom of sac below the supra-patellar line (n = 2)	00	02 (100%)	02 (100%)	01 (50%)	01 (50%)
Total ($n = 62$)	55 (88.7%)	14 (22.6%)	10 (16.1%)	26 (42%)	02 (3.2%)

 Table 4. General summary of our outcomes according to the type of hernia found.

4. Discussion

Inguinal hernia is a public health problem in Africa as a whole and in Cameroon in particular [3]. However a few cases of GISH have been reported in Cameroon, proof of their existence in our community [18]. Our study was limited by the large number of people lost to follow-up, the difficulty of obtaining hernia prostheses because their cost remains high in our context, as well as the beliefs in certain regions where populations have difficulty accepting surgical treatment. The 62 cases of giant inguinoscrotal hernia were included in the study over the 13 years period giving an average of 5 - 6 cases of GISH in a year. There was a male predominance of 57 males to 5 females giving a sex ratio 11:1, similar to most studies [19]. The mean age in our study was 54.7 ± 1.1 years with a range of range 34 - 79 years appears closer to studies done on a series of 103 in Sierra Leone and Ivory

Coast (46 and 48.5 years respectively) [16] [17]. This could be due to the fact that the rural population is aging as the youths move to the cities searching for greener pastures.

All the participants were from rural areas and were involved in physical activities as a source of livelihood, the majority (66%) being farmers. Others, which made up 6% of the participants included teachers, business men and electricians. Therefore, Giant inguinoscrotal hernia affected mainly the illiterate manual laborers. This is similar to Lebeau *et al.* in Ivory Coast [17]; Abdalla *et al.* identified long standing heavy weight bearing as risk factor (59.2% of all risk factors) [16].

Most of our participants were single n = 32 (51.6%), as this medical condition impacted greatly their sexual activity (100% of cases), similar to Lebeau *et al.* in Ivory Coast with a majority of the population with difficulty in penetrating their partner [17] as this condition causes a buried penis.

Those with the sac between the midthigh and supra-patellar line were the most frequent 30 (48.3%). This is contrary to the results from Sierra Leone where the majority of participants presented with sacs extending below knee level [16], probably because they had a larger population size.

The average duration of evolution was 30.8 ± 0.7 years ranging between 14 and 50 years. This is quite higher than the result from Nigeria (average of 14.5 years). This could be explained by their greater sample for a study conducted in private medical health facilities located in sub-urban communities where the population should be younger, and early management of hernia is possible [15].

More than half of our population 55 (88.7%) had hernia that was either spontaneously or manually reducible, same as in west Africa [15] [17]. This especially as those with sac above the patella predominated in all populations. This is primordial given that the surgical management highly depends on the degree of adhesions (alters reducibility) so as to determine if there is need for resection, orchidectomy or other procedures and relies on the surgeon's capacity and technical plateau to achieve them.

Smoking was a relevant comorbidity as it was present in almost half of our population 29 (46%). The nicotine is absorbed in blood and weakens the abdominal musculature which reduces the function of shutter mechanism, thereby causing inguinal hernia [20].

According to the physical status scale of American Society of Anesthesiologists (ASA class) majority of the patients were class I and II; 18 (29.0%) patients had ASA class I, 28 (45.2%) patients had ASA class II, different from the study in Ivory Coast [17] probably because we had a larger proportion of smokers.

Findings in the majority of cases were a fused spermatic cord 83.9% (52) with an edematous omentum 77.4% (48). This is due to portal venous stasis often associated, causing mesenteric and bowel wall edema, swelling the contents of the hernia sac making reduction even more challenging [21].

Orchidectomy was performed in half of the population 32 (51.6%). This is due to the fact that the long standing hernia has prompted fusion of the sac to the cord

which generally makes dissection difficult hence condemning the spermatic cord to inevitable section to prevent unexpected complications like bleeding [9].

The content of the sac was the omentum, caecum and small bowel in the majority of cases which is similar to Lebeau *et al.* [17]. Bowel resection and anastomosis was done in 14 (22.7%) patients, of which 8 small bowel segmental resection and 6 colectomies. This was generally because of edematous bowel, and loss of domain respectively which made reduction difficult and in some cases there was injury to the bowel (6 cases) in the strive to reduce the hernia content as described by literature [21].

Shouldice repair was done in 37% (23) of the participants and Lichtenstein was done in 56.5% (35) of the participants. In 29.0% (18) of the participants an initial Shouldice repair was done which was later converted to Lichtenstein 6 months later. This is with respect to the European Hernia Society (EHS) recommendations which advocates for Mesh repair as best choice or a Shouldice repair in case mesh is unavailable [22]. This is in contrast with most studies in West Africa where a modified Bassini technique was preferred sometimes with "Darning" [15] [19]. A compressive scrotal bandage was used in 60 cases (96.8%), this was to avoid seroma or hematoma formation given the extensive dissection usually required. The compressive bandage prevents hematoma formation by realizing appropriate hemostasis which is not the case with drainage used by some authors [23].

We recorded only 2 cases (3.2%) of abdominal compartment syndrome; known to be the most dangerous complication in giant hernia surgery [9] probably because a majority of our participants had reducible hernias.

We equally had 15 (24.2%) cases of seroma and 2 (3.2%) cases of surgical site infection. These results are similar to Lebeau et al in Ivory Coast who reported 9.52% of seroma but rather had 57.14% of scrotal hematoma which was not reported in our study [17]. This was probably facilitated by the compressive scrotal bandages which were used post-operatively.

Pain occurred in a short run in 18 (29%) patients and became chronic only in 6 (9.7%) patients after 3 years follow up. Pain is usually related to nerve trauma or compression during the surgical repair [24]. Urinary retention occurred in 16 (25.8%) patients probably due to the spinal anesthesia as described in literature [25], this all resolved spontaneously.

We recorded a Case fatality rate (CFR) of 3.2% (2 cases), the two cases of death in the post-operative period from abdominal compartment syndrome and perioperative bleeding. This is comparable to literature as reported by a meta-analysis made in 2023 which recorded 4 cases of death out of the 9 studies involved [19]. There was no case of recurrence after 5 years similar to Ivory coast after 29.19 months follow up [17].

Before surgery, all the participants had an altered gait with development of new patterns of movement. All the participants admitted having their sexual activities modified. The level of modification of sexual activities were further evaluated and 2 (3.2%) of the participants with congenital inguinoscrotal hernia admitted no

sexual activities since birth. And hence, 36 participants felt rejected by their community. This correlates with the results of Lebeau *et al.* in Ivory Coast who found that all patients had cosmetic and functional problems affecting their everyday lives going from difficulty in finding suitable clothes, in standing, walking, sitting or lying down to difficulty to penetrate their partners during sexual intercourse [17]. However there was great improvement in these characteristics after surgery, proof of the necessity of appropriate management of these patients for physical, social and psychological wellbeing.

5. Conclusion

GISH is a reality in our community. It is frequent in rural areas where populations are involved mainly in land ploughing activities. This condition heavily impacts social integration which can go right up to rejection. Its treatment relies on surgery, depending on the reducibility; the corner stone in determining the possibility of surgery in rural areas with minimal risk of complication. Application of appropriate management orientation for the individual patients is the key to successful treatment.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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