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Surgery for gigantomastia at the AKANDA Army Training Hospital: Analysis of 4 cases and literature review

Abstract

Objective: This study aims to evaluate the outcomes of surgical interventions for gigantomastia in at the obstetrics and gynaecology department of the Hôpital d'Instruction des Armées d'Akanda (HIAA).

Patients and Methods: This was a prospective, descriptive study conducted from 1 June 2019 to 31 October 2022, Inclusion criteria comprised women who seeked consultation at HIAA due to unilateral or bilateral gigantomastia, have a benign primary or tumoral gigantomastia. Participants were required to consent to a minimum follow-up period of 6 months post-operation by the HIAA medical team and be available for telephone follow-ups beyond the initial 6 months.

Results: The prevalence of gigantomastia was 1.05% (10/952). The mean age of the patients was 27 years. The mean BMI was 27.7 kg/m^2. All patients wore a very large (≥D) cup size. The mean breast axis was 36.25 cm for straight breasts. The most frequently performed method was the inverted T with superior-internal flap (57%). The average weight of the operative parts was 1350 g for right breasts. Only one patient had delayed skin wound closure. Only one patient had a suture disunion. Regarding the plastic result, two patients were classified <<average result>> and the other two (50%) <<good result>>. Two patients report << very satisfied>>and the other two were satisfied.

Conclusion: This study presented the preliminary results of an ongoing study at the HIAA. The inverted T technique with syuperomedial flap was the most commonly used, with few early complications. The plastic results after the 6th month are appreciable.

Keywords: ginantomastia-mammary reduction-oncoplasty-inverted T

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Assoumou Obiang Pamphile, Minkobame Ulysse, Makoyo Opheelia, Ambounda Nathalie, Atsame Prisca, Mewie Anouchka, Eya'Ama Robert, Bang Jacques A, Sosthène Mayi-Tsonga

Obstetrician gynecologist; Department of Obstetrics Gynecology, Faculty of Medicine of Libreville, University of Health Sciences (USS), Libreville, Gabon.

Correspondence: Assoumou Obiang Pamphile, Obstetrician gynecologist, Department of Obstetrics Gynecology, Faculty of Medicine of Libreville, University of Health Sciences (USS), Libreville, Gabon BP: 1421 Libreville-Gabon, Tel 0024177878440, Email assoumobian@yahoo.fr

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Introduction

The breasts are paired glandular organs located on the anterior wall of the thorax and designed to secrete milk for the nutrition of the newborn. They are considered a sign of femininity.[1] However, the notion of breast aesthetics has changed considerably over time. In the past, breast hypertrophy and plumpness were appreciated.[2] Today, there is a new conception of the harmony of the human body, represented by slimmer models that better reflect modern habits of dynamism, physical culture and a balanced diet.[2] Gigantomastia, the final stage of breast hypertrophy, is the presence of one or two breasts that are very large in relation to the patient's morphology.[3–6] Chavoin[3] estimates that the average volume of a normal breast, in the absence of excess weight and depending on size, is 250g to 350g. Beyond this, breast hypertrophy occurs, always accompanied by ptosis. This hypertrophy, characterized by an excessive and abnormal enlargement of the breasts, can often grow to proportions several times larger than the typical size. As of 2022, a universally accepted definition and classification for gigantomastia were yet to be established. Two recent articles, by Kasielska-Trojan[4] published in February 2022 and Jean-Louis[5] published in December 2021, state that there is no consensus on the definition and classification of gigantomastia. Like many other rare diseases, it seems that gigantomastia remains a neglected pathology as there are no expert conferences ruling on this entity. Dancey's article [6] seems to be the benchmark in terms of definition. Dancey[5] considers that the diagnosis should be made postoperatively, i.e. based on the measurement of the weight of the breast resection, which should measure more than 1500 g per breast. However, there are discrepancies in the literature, as this resected weight can range from 800 g to 2000 g per breast.[3,6,7] This definition is not practical in daily consultations. To help clinicians, Dancey[6] recommends referring to the size of the patient's support cup, which should be larger than a D cup. In terms of classification, pure gigantomastia is usually bilateral. However, there are cases of unilateral gigantomastia.[8,9] It may also be tumour-related, linked to a benign breast mass.[10] As can be seen, gigantomastia is multifaceted, and is variously defined and classified. This diversity is certainly linked to its extreme rarity.[3–10] In its classic, idiopathic form, the aetiology is undetermined but could be due to hormonal imbalance, reduced catabolism or hypersensitivity of the target organ to hormonal and genetic stimuli.[4] The psychological, social and above all physical repercussions can make this disease a real handicap. In the absence of effective medical treatment, breast reduction surgery is most often recommended. The aim is to obtain a harmonious, stable breast shape with minimal scarring and good areolar sensitivity.[11] Gigantomastia requires a change in dress and behavioural habits because of the embarrassment felt by patients showing excessively large breasts. These patients therefore avoid sporting or group activities, leading to a more sedentary lifestyle and sometimes a degree of isolation.

They may experience neck, back and shoulder pain, headaches and balance problems.[2] This paper outlines the outcomes of four cases of gigantomastia treated at the gynaecology-obstetrics department of the Hôpital d'Instruction des Armées d'Akanda (HIAA). A review of the literature will be followed by an update on this reconstructive surgery.

Methodology

This was a prospective, descriptive study conducted within the obstetrics and gynaecology department of the Hôpital d'Instruction des Armées d'Akanda (HIAA). The study period ran from 1 June 2019 to 31 November 2022, To be included in our study, women had to meet the following criteria: have consulted the HIAA due to unilateral or bilateral gigantomastia; diagnosed with a benign or non-tumorous tumoral gigantomastia; have agreed to be followed up for at least 3 months after the operation by the HIAA medical team; and have agreed to be contacted by telephone even after the 3rd month of follow-up.

We did not include women with gigantomastia of malignant origin. We excluded patients who had gigantomastia during pregnancy, gigantomastia associated with cancer and those whose resection volume was ≤ 800 g. Pre-surgical management of gigantomastia at the HIAA consists of 3 consultations. An initial consultation where women presenting with mastopathy are seen by appointment from 8am to 1pm, on Tuesdays and Thursdays. In the case of gigantomastia, clinical diagnosis is usually straightforward. The breast examination begins with a breast inspection, followed by a history taking and a collection of the functional signs experienced by the patient. The patient's breasts are then palpated in the supine position. In the case of breast hypertrophy, and especially gigantomastia, a pre-operative drawing (Wise diagram) is made in the supine position using a tape measure and an indelible dermographic marker. At the end of the clinical examination, the following information is recorded on the consultation register: socio-demographic characteristics, whether or not there is breast asymmetry, the degree of asymmetry, the measurement of the breast axis, the measurement of the distance of segment III and the degree of breast ptosis. Paraclinical assessment includes : bilateral breast ultrasound, which is systematic (other morphological examinations may be prescribed if necessary, i.e. bilateral mammography or breast MRI); a minimum hormonal work-up (FSH, ultrasensitive TSH, Prolactinaemia, Estradiolaemia, Progesteroneemia); a work-up to assess the patient's condition (blood count, blood sugar, urea, creatinine, ECG, transaminases, chest X-ray); a blood work-up to look for a systemic disease (Lupus, rheumatoid arthritis, etc.) is only prescribed if the patient has a history of the disease. A blood test for a systemic disease (lupus, rheumatoid arthritis, etc.) is only prescribed if the patient's history indicates a history of immunodeficiency. During the second breast examination, the results of the tests are viewed and analysed in the presence of the patient and often an accompanying relative. In the case of tumoral gigantomastia, we systematically recommend a breast biopsy to detect the histology of the tumour. In the case of non-tumorous gigantomastia, we systematically recommend a psychological consultation with one of the HIAA psychologists. During this consultation, the Rosenberg self-esteem test is carried out to ascertain the patient's personality. During the third senological consultation, the result of the psychological opinion is notified. Informed information is provided to the patient and her companion(s). The type of surgery and any post-operative complications are explained. Once again, verbal or written consent is required. A request for a pre-anaesthetic consultation (CPA) is given to the patient. For cases of tumour gigantomastia, the date of the biopsy is fixed. The biopsy is performed in the operating theatre, under sedation, after it has been scheduled at an operating theatre meeting. It is performed on an outpatient basis, using a 14-gauge, 9-cm-long Tru-Cut gun. At the fourth breast examination, the results of the CPA and biopsy are reported, and the date for the breast reduction is set. The patient is admitted to hospital the day before the operation. On the morning of the operation, a body shower using Betadine® Dermal is recommended in the patient's room. The patient is then taken to an examination room so that the final Wise diagram can be drawn before she is transferred to the operating theatre.

In the operating theatre, the paraspinal block is performed by an anaesthetist in two stages: first the paraspinal block, followed by general anaesthesia with oro-thracheal intubation. At the beginning of our experience, surgery was performed by a single surgeon, one breast at a time. With time and the training of other operators, this surgery is now performed by a double team of surgeons, which has reduced the operating time. Each surgical specimen is sent to the HIAA's pathological anatomy laboratory to be weighed and analysed. Post-operatively, the patient is monitored for two hours in the post-operative surveillance room. The course of the operation, the operating time, blood loss and the weight of each operative part are recorded in the consultation register and in an Excel file kept by the department's medical team. Inpatient antibiotic therapy is prescribed for all patients, intraoperatively (2g CEFTRIAXONE IVD) and 1g/24h postoperatively, combined with multimodal analgesia consisting of paracetamol 1g/08h combined with Nefopam 20mg/08h. Removal of the two drainage Redons is authorised when blood loss reaches ≤ 50cc/day. The first dressing is applied on postoperative day 4, then every 48 hours until the wound is healed. Discharge is authorised on D4 or even D5 if there are no complications. A course of 3rd generation cephalosporin antibiotics is prescribed orally for 15 days, combined with analgesics and anti-oedema medication for 20 days. On leaving hospital, patients were instructed to: to return to the ward for dressings, which were carried out by a Resident Doctor on each occasion, and a detailed examination of the skin scars was carried out; to wear a support bra for 6 weeks, day and night; not to engage in any strenuous physical activity for 3 months; to avoid sleeping on their stomachs for the first month; to wash the body without wetting the dressings until they have completely healed; to wear compression stockings for 15 days; if the wound healing is hypertrophic, a consultation with a dermatologist will be useful in order to carry out subcutaneous infiltrations or the application of healing creams.

At D10, an initial assessment is made by the surgical team (surgeons and resident doctors). Each time, we report on the progress made in closing the skin wounds, whether or not there is any scar disunity, superinfection, haematoma or post-operative breast oedema, and an image is taken using a camera (mobile phone). In the event of scar disunion, a decision is taken on the therapeutic approach: either to simply continue dressing with fatty Tulle or Urgo Tulle, or to perform an additional suture with 2/0 Vicryl under local anaesthetic.

At D20 and D30, two further clinical assessments were carried out by the entire medical team. Photographs are taken. If the patient is progressing well, she is seen again at 3 months. If not, the patient continues to be monitored every two days until the wounds are completely closed.

At the third month, the patient is seen as an outpatient. The clinical examination includes:

A. An interview to determine whether the functional signs experienced before the operation still exist.

B. Assessing the sensitivity of the MAP during skin pinch palpation

C. Assessment of the quality of skin healing, which we have classified according to the criteria below [30]

   i. Normal scar: this is a thin or discreetly enlarged scar that is flat and even to the touch, with a colour identical to that of the surrounding skin. It is discreet

ii. Unsightly scar: a normal scar that is too visible

iii. Pathological scars: hypertrophic scars and keloids

D. The plastic result is assessed using a scoring grid that takes into account the projection of the two breasts (excellent: > 6cm, good: 4-6cm, poor: < 4cm), the presence or absence of asymmetry (symmetrical breasts; moderate asymmetry: < 2 cm; significant to major asymmetry : ≥ 2 cm), the form of the two breasts (excellent: normal/ conic/sans retraction; good: retraction localised; bad: sein deformed/devié) and quality of the scar the PAM (excellent: good: disgracieuse; bad: pathological) and the aspect of the PAM (ovalaire and regular, ovalaire and irregular, not ovalaire). A score of 0 was assigned to "poor", 1 to "good" and 2 to "excellent". In this way, we determined the following plastic results: excellent result (score of 10), good result (score between 7 and 9), average result (score between 4 and 6) and bad result (score ≤ 3).

E. Patient satisfaction is assessed by questioning: very satisfied, satisfied or dissatisfied. For each patient, we recorded and studied the following parameters:

F. Socio-demographic characteristics: age, parity, professional status, marital status, level of education;

G. Preoperative clinical characteristics: BMI, bra cup size, functional signs, unilateral or bilateral gigantomastia, axis of the pathological breast or breasts, whether the gigantomastia is tumoral, whether there is breast asymmetry, whether there is breast ptosis, results of additional examinations (ultrasound, mammography, ACR classification, MRI, biology), biopsy results in the case of tumours;

H. The surgical aspects: the surgical method used, the duration of the operation, blood loss, the weight of each surgical part;

I. In-patient monitoring: length of stay, complications (haematoma, fever, haemorrhage) ;

J. Monitoring during the first month: the time taken to close the surgical wounds (sub mammary fold or SSM, vertical branches of segment III, the perimeter of the PAM), the occurrence of a complication (suture disunion, total or partial necrosis of the PAM, superinfection of the wound), and the result of the anatomopathological examination;

K. Results from the 6th month: functional signs experienced (persistence or disappearance), sensitivity or otherwise of the PAM, quality of healing (normal, unsightly, pathological), plastic result (excellent, good, poor) and patient satisfaction (very satisfied, satisfied, dissatisfied).

The data was entered and analysed using a Windows 10.0 Excel file and expressed in tabular form. They were expressed as percentages for the qualitative variables and as means for the quantitative modalities. We followed the recommendations of the Declaration of Helsinki, drawn up by the World Medical Association, on the ethical principles to be observed by doctors and other participants in medical research involving human beings.

Results

During this period, our breast clinic attended to 952 patients, among whom 10 were diagnosed with unilateral or bilateral gigantomastia. Six of these ten patients (60%) had already undergone surgery and 4 others were awaiting surgery. Among the six operated cases, 4 patients met our inclusion criteria and constituted our study sample. The other 2 patients were 2 cases of malignant gigantomastia. One patient had bilateral breast cancer with no response to chemotherapy and underwent amputation of both breasts with bilateral axillary curage. The other patient had bilateral gigantomastia with a large right breast tumour and underwent bilateral inverted-T breast reduction. The tumour, initially diagnosed as a breast abscess after cytopuncture, turned out to be an intermediate-grade sarcoma in necrobiosis. Her case was referred to a multidisciplinary consultation meeting (RCP).

The prevalence of gigantomastia in our department is 1.05% (10/952). The mean age of our five patients was 27 years with extremes of 15 and 36 years. The mean parity was 1.7 parities with extremes of 0 and 4 parities. Two (50%) patients were unemployed and two (50%) were employed. Three (75%) patients were single or cohabiting and one (25%) was married. One (25%) patient had primary education, two (50%) had secondary education and one (20%) had a university degree.

The mean BMI was 27.7 Kg/m^2 with extremes of 20.6 Kg/m^2 and 31.6 Kg/m^2 (Table 1). All (100%) patients wore a very large cup size (≥ D) as shown in Table 1. One (25%) patient reported suicidal ideation (Table 1). Gigantomastia was bilateral in 3 (75%) patients and unilateral in one (25%) patient (Table 1). In the latter case, the gigantomastia involved the right breast. Clinical examination revealed three (75%) cases of tumoral gigantomastia and the clinical characteristics of these three cases of tumoral gigantomastia are presented in Table 1. The mean breast axis was 36.25 cm, with extremes of 30 cm and 51 cm for the right breast (Table 2). It should be noted that in the case of unilateral right gigantomastia, the left breast was also hypertrophic (axis: 28 cm) but the family refused to have it reduced during the same operation, preferring to postpone the operation until a later date. All (100%) of our patients had asymmetric breasts. The degree of asymmetry was usually moderate (Table 1). Breasts classified as ACR2 were the most numerous (n=4), i.e. 50% (Table 3). Mammography was not systematically requested. For the one patient (25%) in whom this examination was performed, the result did not reveal any breast abnormality. MRI was not systematically requested. In the one patient (25%) in whom it was requested, the result confirmed the existence of an adenofibromatous breast mass. Biological examination was normal in 3 (75%) patients. One (25%) patient had an elevated prolactin level of 31.20 mg/ml. The three cases of tumoral gigantomastia were all (100%) biopsied. The results were as follows: 1 case of giant adenofibroma associated with adenosis, 2 cases of simple adenofibroma.

Among the 7 breasts operated on, the most frequently performed method was an inverted T breast reduction with a superior-internal flap (57%), as shown in Table 4. The average distance of lift of the PAM flap for right breasts was 15.75 cm, with extremes of 7 cm and 32 cm (Table 4). The average operating time was 03 hours 30 minutes, with extremes of 03 hours and 04 hours. Average blood loss was 375ml, with extremes of 200ml and 500ml. For right breasts, the weight of the operative parts was on average 1350g with extremes of 950g and 2000g (Table 4). The average hospital stay was 05.5 days, with extremes of 05 days and 07 days. No complications were noted during the hospital stay. At D16, the three skin wounds were completely closed in three (75%) patients and one (25%) had delayed closure (Table 5). For the three patients who had completely closed wounds at D16, the average delay in closure was 13 days for the sub mammary fold, with extremes of 12 and 15 days. Suture disunion was reported in only one patient (25%). Of the 7 breasts operated on, segment III (n=2 breasts, i.e. 28.6%) was most affected by this early complication, followed by the sub-breast fold (n=1, i.e. 14.3%). Only one patient had normal healing quality from the 1st month (Table

5). The anatomopathological results were as follows: 1 case of giant adenofibroma associated with sclerosing adenosis, 2 cases of simple adenofibromas with no abnormalities in the rest of the glandular parenchyma and 1 case of bilateral fibrocystic mastosis with no atypia. One patient presented with epidermolysis of the skin around the MAP at D30. This patient had a long delay in closure of the skin wounds on segments III and the left PAM, as shown in Table 5. The mean time in months from operation to the last postoperative visit was 14.25 months with extremes of 6 months and 36 months. At six months, all (100%) functional signs had disappeared in all (100%) patients. After the 6th month, only one (25%) patient remained insensitive to MAP pinching, and this was the patient who had benefited from the Thorek technique. The other three (75%) experienced a marked improvement in the sensitivity of their MAP. The scar in the sub mammary fold was judged to be "normal" in all 7 (100%) of the breasts operated on. The segment III scar was "normal" in 6 breasts (86%), as shown in Table 5. Two (50%) patients reported being "very satisfied" and the other two (50%) were satisfied (Table 6). The two "very satisfied" patients had benefited from the inverted T technique with superior-medial flap, and the two "satisfied" patients had benefited from the inverted T techniques according to Mac Kissoc and Thorek respectively (Table 6).

Table 1 Distribution of patients according to preoperative clinical characteristics parameters

	N=4	
	n	%
BMI		
≥25	3	75
≤24,9	1	25
Cup size		
A to E	0	0
F	3	75
G	1	25
Functional signs		
Chronic mastodynia	4	100
Chronic headaches	4	100
Chronic back pain	4	100
Aesthetic discomfort	4	100
Body denial	4	100
Low self-esteem	4	100
Suicidal ideation	1	25
Combination of at least 3 signs	4	100
Types of Gigantomastia		
Bilateral	3	75
Unilateral	1	25
Tumour	3	75
1 single mass	2	50
≥ 2 masses	1	25
Tumour size ≤ 10 cm	2	50
Tumour size > 10 cm	1	25
Breast asymmetry	4	100
Moderate asymmetry	2	50
Significant asymmetry	1	25
Major asymmetry	1	25

Table 2 Breast axes

Measurement of breast axes	Right breast	Left breast
Case n°1	35 cm	28 cm
Case n°2	51 cm	50 cm
Case n°3	29 cm	28 cm
Case n°3	30 cm	31 cm
Moyenne	36.25 cm	34.25 cm

Table 3 ACR classification of the 8 breasts scanned

Patients (n=4)	Right breast	Left breast
Case n°1	ACR2	ACR1
Case n°2	ACR3	ACR3
Case n°3	ACR2	ACR1
Case n°4	ACR1	ACR1
Total	4	4

Table 4 Breakdown by surgical aspect

Parameters		
	N=7	
	Right breast	Left breast
Surgical methods		
Case N°1	Inverted T according to Mac Kissoc	Not operated
Case N°2	Inverted T according to Thorek	Inverted T with Thorek
Case N°3	Inverted T with LSI	Inverted T with LSI
Case N°4	Inverted T with LSI	Inverted T with LSI
PAM ascent distance		
Case N°1	7 cm	Not operated
Case N°2	32 cm	31 cm
Case N°3	11 cm	10 cm
Case N°4	13 cm	14 cm
Weight of surgical parts		
Case N°1	1250 g	Not operated
Case N°2	2000 g	2300 g
Case N°3	1200 g	1350 g
Case N°4	950 g	931 g

SIL, Superointernal flap

Table 5 Post-operative course

Clinical appearance at D 16	Right breast			Left breast		
	PAM	Segment III	SSM	PAM	Segment III	SSM
Cas N°1	FC	FC	FC	*	*	*
Cas N°2	FC	FC	FC	FC	FC	FC
Cas N°3	FC	FC	FC	FC	FC	FC
Cas N°4	FC	FI	FI	FI	FI	FC
Healing quality						
at 1 month						
Case N°1	HP	HP	HP	*	*	*
Case N°2	E	HP	HP	E	HP	HP
Case N°3	N	N	N	N	N	N
Case N°4	N	D and PD	D and PD	D and PD	D and PD	N
Quality of healing at 6 months						
Case N°1	Normal	Normal	Normal	*	*	*
Case N°2	Pathological	Normal	Normal	Pathological	Normal	Normal
Case N°3	Normal	Normal	Normal	Normal	Normal	Normal
Case N°4	Unsightly	Normal	Normal	Unsightly	Disgraceful	Normal

*: non-operated; PAM, areola-mammary plate; SSM, sub mammary fold; FC, complete closure; FI, incomplete closure (presence of one or more points of disunion); HP, hyper-pigmented; D, depigmented; N, normal; E, epidermolysis; PD, point of disunion. Normal: thin or slightly enlarged scar but flat and even to the touch with a colour identical to the surrounding skin; Unsightly, normal scar but too visible because too enlarged (> 2 cm); Pathological, hypertrophic scars and keloid

Table 6 Plastic results

Results plastic	Both breasts					Total score	Results
	Projection	Symmetry between the two	Breast shape	PAM scar	PAM aspect		
Case N°1	0	0	1	2	2	5	Medium
Case N°2	2	2	1	0	1	6	Average
Case N°3	2	1	2	2	2	9	Good
Case N°4	2	2	2	1	1	8	Good

Comments

We present the preliminary results of an ongoing prospective study at the Akanda HIA. Gigantomastia surgery has undergone many advances over the last ten years with the introduction of oncoplastic techniques. Previously, older techniques such as the Thorek and Mac Kissock were used. The use of plastic surgical techniques in breast surgery, whether benign or malignant, has improved the results of gigantomastia surgery. But these techniques require a great deal of mastery of gestures and meticulous knowledge of certain operative subtleties, which can only be acquired through long and assiduous training. We do not claim to have fully mastered them at this stage of our experience. We are still learning. Hence the importance of this self-assessment in order to improve. This is not cosmetic surgery, and we repeat this to all our patients. It is reconstructive surgery using techniques born of plastic surgery, known as oncoplastic surgery, the aim of which is to bring some comfort to patients. We also recognize that the small size of our sample may constitute a selection bias for this work. Similarly, the assessment of plastic results after the 6th month, and the evaluation of patient satisfaction, may also constitute an information bias, as we are both "judge and jury". Notwithstanding these biases, we believe that certain comments can be made and may enable us to improve, in the interests of our populations.

The prevalence of gigantomastia is very low in our department. It is well known that this is a rare condition in the literature.[5,12–14] This could be explained by the fact that our work is a preliminary study, and by the fact that it was carried out in only one hospital in the country. There are no population-based studies in the literature, which makes it impossible to determine the exact prevalence of this clinical entity. Usually, women are very embarrassed to talk about this condition. They rarely seek help, or only when the psycho-affective and physical repercussions become disabling. Public information and screening campaigns should be launched (in secondary schools, communities, etc.) to raise awareness of the treatment options for this condition and hopefully increase the number of cases. Nevertheless, the literature is full of case studies and cohorts of cases.[5,8,9,12,15–18] In Black Africa, Togo Keita,[12] in a study of gigantomastia in the B surgery department of the CHU du Point G in Bamako, Mali, in 2022, found four cases over a period of six years. Kibadi[9] and Traoré[10] published one case each, in the Democratic Republic of Congo and Mali respectively. It is mainly North African authors who have extensive experience of this condition in Africa. Bouchaouch,[11] Slaihi[19] and Belcadi,[20] all in Rabat, have published 5 cases in 2008, 64 cases in 2022 and 51 cases in 2020 respectively. In Gabon, we were unable to find any published studies on the same subject. In the West, the literature is rich and also concerns cases or even cohorts of cases.[4,18,21] Gigantomastia affected rather young women, as shown by the average age of the patients in our series (27 years). This is consistent with several series.[12,22–24] Like Togo Keita,[12] we can say that gigantomastia is a pathology that can occur as early as puberty or even before puberty.

The size of the cup varied from F to G in our study. Belcadi[20] found a cup size almost similar to ours, ranging from E to F. These women have difficulty finding bras in their size and many of them hardly ever wear them anymore, as the youngest patient (15 years) in our series admitted. This teenager was forced to "wear a scarf over her chest every time, in order to reduce her large breasts and avoid the gaze of others". A major risk is the patients' personal hygiene. As they can no longer find a bra that fits, some are forced to wear the same bra over and over again, with risks to their thoracic hygiene (sweating, maceration of the folds, etc.), as Tarek has pointed out.[23] The clinical picture of our patients was similar to that reported in the literature.[11,12,19,23,25] These included functional and aesthetic problems, including back and neck pain, postural deformities and recurrent infections in the sub-mammary region. Bilateral gigantomastia was the most common in our study (75%), most often associated with a fibroadenoma. Gaye[24] and Palvé[26] report in their respective studies a predominance of bilateral gigantomastia. The mean breast axis in our study is similar to that reported by Abozeid,[27] in a case series study with 12-month follow-up of the Mac Kissock reduction plasty revisited, who found a similar result, i.e. 34.12 cm, thus reflecting the size of the gigantomastia. Other studies, such as Gaye[24] and Chetty,[21] used the arrow in their work and found arrows of 31 cm and 44.13 cm respectively. The more severe the gigantomastia, the higher the axis. The choice between axis and sag is purely academic. The axis is much more commonly used by the French-speaking school. The arrow, on the other hand, is used more by the Anglo-Saxon school.

In our study, we found a predominance of ARC I breasts. Slaihi,[19] in a study on the evaluation of patient satisfaction after breast reduction surgery, also found a predominance of cases classified as ACR 1. These results show that gigantomastia remains a benign pathology, although very embarrassing. Anatomopathological results confirmed the benign nature of the pathology as described in the literature.[28]

Three surgical techniques were used in our study: the superior-internal dermo-glandular flap, the Thorek technique and the Mac Kissock technique. The superior-internal flap technique is currently the most widely used by many practitioners.[3,9,21,28–32] It is the easiest to perform, with better aesthetic results.[8,9,15,21,23,29,31–33] and a more harmonious breast shape. It reduces the horizontal spread of the breast that is common in pure upper flap reduction. This technique was first described by Orlando[34] in 1975. It was tested and found to be safe in a case series by Hauben,[35] followed by further studies by Tarek[23] and Finger.[36] It has demonstrated its superiority in preserving continuity of medial and central breast tissue and contributing to medial and aesthetically pleasing fullness.[23] Betul,[22] in his study investigating effective volume reduction and improved aesthetics for the treatment of gigantomastia using the superior dermo-glandular pedicle, showed that this technique can be applied to all cases of gigantomastia and improved aesthetic results can be achieved with minimal complications. It is a versatile and reliable method for breast reduction surgery in gigantomastia. It gives a more pleasing natural breast projection, while preserving the sensation of the nipple.[23] At the time of our first operations, we were very reluctant to perform this procedure given the poor quality of the skin in these patients. We feared the occurrence of vascular insufficiency of the nipple flap and therefore the possibility of partial or total necrosis of the PAM. For this reason, we followed the recommendations of Hulard[37] repeated by Sankalé[38] who recommend using the Mac Kissock when the axis is less than 27 cm and that above 30 cm, the Thorek should be used. Between 27 cm and 30 cm, one or other of these two techniques should be used, depending on the quality of the skin, the richness of the gland and the patient's age. For Sankalé,[38] African skins, which are very often cortised, justify the use of these two methods almost exclusively. In reality, the superior-internal dermo-glandular flap technique can be used for all types of gigantomastia.[23] It is simple and can be applied even to severe gigantomastia.[39] The advantages of this method are, in particular, the preservation of the innervation and vascularisation of the PAM by a dermo-glandular flap with a superior-internal pedicle, while ensuring respect for the cutaneous-glandular unit.[40] It also gives better breast projection with prominent nipples, unlike the Thorek procedure where the MAPs are necessarily flattened.[23,39,40] When the distance at which the PAM rises is too great, beyond 10 cm, it is advisable to increase the width of the flap, so that the width is always at least equal to half the length of the flap. This reduces the occurrence of problems with the vascularisation of the flap and the MAP. On a completely different level, surgery to treat gigantomastia is virtually the only effective treatment. Medicinal treatments (anti oestrogen, testosterone, anti prolactinemiants....) do not provide lasting benefits. On the other hand, in adolescent girls, surgery should be indicated when breast morphology has stabilised, i.e. when there have been no major changes in breast volume in the last year in a girl who has been breast-regulated for at least three years; this would avoid altering the mechanical quality of the skin under the weight of the breasts.[41] Our average hospital stay of 5.4 days is comparable to that found by Togo Keita, which was 4 days, although only one surgical technique was used for all her patients. Our length of stay in hospital seems to have been reduced, from 07 days to 05 days. The experience and confidence of the whole team means that we can discharge patients as early as the 5th day, especially as they are systematically reviewed every two weeks for breast care. As with any surgery, there is a risk of complications. There were no immediate complications during hospitalisation. Two types of early complications were noted, namely a case of delayed closure of skin wounds and a case of suture disunion. This was the same patient, following a bilateral superior-internal flap. Delayed wound closure was limited to the intersection of the vertical and sub mammary scars. This patient had a very high BMI (31.7 kg/m^2). This comorbidity factor could explain the delay. This delay is often observed in patients with risk factors, as described by Palvé[26] and Sachs[25] in their respective studies. Management of delayed skin closure consists of continuing local care with rigorous asepsis. We recommend systematic oral antibiotic treatment to avoid the development of a local infection. The suture disunions affected both breasts of our patient and were located on the right and left sub mammary folds, the suture junctions of the inverted T of each breast and those of the junction of segment II with the PAM. They appear from the 14th postoperative day. Suture disunion is the most frequent early complication in the literature.[42] They occur in 0.8% to 45.9% of patients operated on.[42] They require prolonged dressing. They are often superficial but may extend deep down and become very serious. Ogunleye,[43] in a study of complications after breast reduction surgery, also found a predominance of suture disunion. They lengthen the time taken to close skin wounds and can lead to pathological scarring. We also noted a case of epidermolysis of the PAM which appeared during the 2nd month postoperatively. This case involved a patient who had undergone a Thorek. This minor complication is common in Thorek. Management consisted of continuing with local dressings, if possible with fatty Tulle®. Although this is a minor complication, it may herald partial or total necrosis of the MAP. It requires very close monitoring. In the case of partial necrosis, repeat surgery may be useful. Total necrosis requires a new areolar plasty. According to Palvé,[26] these complications occur most often in patients with at least 2 risk factors, such as BMI > 30, smoking, resection weight > 800g, bilateral surgery and age < 50 years. Palvé[26] states that the overall complication rate increases with the presence of statistically

significant risk factors. There were no late complications (beyond the 1st month). After any surgery, the surgical specimens are immediately subjected to anatomopathological examination. In our study, all parts were subjected to this examination and no malignancy was found. Scheefer[28] also found benign hyperplasia in his study, thus confirming the benign nature of gigantomastia.

All four patients were followed up for at least 6 months, allowing us to assess the quality of their healing. However, this is a dynamic phenomenon that is constantly changing. As a result, the assessment made at 6 months is not exhaustive, as it may change over time. As far as functional signs are concerned, all the patients said that they no longer felt any pain, particularly neck and back pain. Admittedly, this evaluation requires the use of different types of evaluation questionnaires, the best known of which is the Breast-Q questionnaire,[44] but these are more suitable for large series of cases and not for small cohorts such as ours. The Breast-Q questionnaire[44] is an evaluation guide developed in 2009. It is widely used by breast surgeons and researchers to capture information on the health-related quality of life and satisfaction of patients who have undergone breast surgery. It can be used to compare pre- and post-oncoplasty outcomes. Among other things, it has made it possible to gain recognition of the benefits of oncoplastic reduction surgery for patients suffering from breast hypertrophy,[45–47] especially those with the serious handicap of gigantomastia. In the study by Rogliani M,[45] all women who underwent breast reduction had a significant improvement in the physical and psychological symptoms associated with breast enlargement, as well as in their overall quality of life, 12 months after the operation. Rogliani M[45] objectively demonstrated that breast reduction increases patients' satisfaction with their body image and improves their lives from a psychological and relational point of view, by comparing the preoperative and postoperative scores obtained with the Breast-Q self-evaluation and the Body Dysmorphic Disorders Rating Questionnaire (BDDE-SR23). This is the real benefit of this reconstructive surgery. It can bring some relief to patients, improve their interpersonal relationships and boost their self-esteem. Apart from Thorek, the other techniques help to limit the reduction in sensitivity of the PAM. Three patients (75%) experienced this reduction in sensitivity, but it reappeared gradually and was already noticeable at 6 months. Its reappearance is progressive over time. Its pathogenesis is poorly understood, but it seems to be due to the reduced mobility of the PAM secondary to peri-areolar de-epidermisation.[48] The quality of healing after breast oncoplasty cannot be assessed before the 6th or even 12th month.[49] Similarly, scarring is a histological and physiological phenomenon that is often uncontrollable or even random. It depends on many factors (race, associated comorbidities, surgical techniques, etc.). Two patients presented with abnormal scars at 6 months: one on both PAMs (patient who had benefited from the Thorek technique) and another on segment III and on the PAM (one of the patients who had benefited from the superior medial flap technique). We believe that these were induced not only by the poor quality of the skin in the Thorek reduction patient, but also by the Thorek technique itself. This patient's breast skin was cortised, covered in stretch marks and wrinkled, with a highly developed subcutaneous venous circulation. The folds under the breasts were macerated. Poor skin condition can lead to poor scar quality.[49] In addition, she had a comorbid condition, with long-standing arterial hypertension. In addition, Thorek is well known for its risk of disturbing vascular perfusion of the MAP, which was confirmed by the occurrence of epidermolysis of both MAPs in this patient. The second patient also had a comorbidity, namely obesity. This factor is known to induce postoperative complications[33,42,50,51] and abnormal, unsightly scars in this patient. As for the plastic results, we reiterate the possibility of a bias linked to the fact that we were both judge and jury. Chetty[21] had the results of his 31 patients evaluated by fellow plastic surgeons practising in a hospital other than his own. Castro Ferreira[29] involved independent plastic surgeons and observers, without specifying the quality of the latter. It is better to use other practitioners to evaluate these results. This was not the case in our work, which constitutes a serious bias. However, we are not aware of any breast plastic surgeons practising in Libreville. We used the classification of Chetty,[21] which is comparable to that of Castro Ferreira.[29] Two of our patients had an "average" score. These were the two obese patients in our series. This comorbidity led to abnormal scarring and, ultimately, to "average" results. In Chetty's study,[21] 90% of patients obtained a "good" plastic result. It was above all the quality of the skin scars that had a negative impact on the evaluation scores.[29] However, it should be borne in mind that there is no such thing as a perfect result, even in the hands of Western experts.[29] Let's hope that, over time, our plastic results improve further. During the various consultations, patients were told that this was not cosmetic surgery, but reconstructive surgery with a risk of complications. The patients therefore underwent a reduction for purely functional reasons and were all satisfied, with 50% of them very satisfied. They noted a marked improvement in quality of life postoperatively. Slaihi[19] also found satisfactory to very satisfactory results in 79% of patients, as did Togo Keita,[12] in whom all patients in her study were satisfied postoperatively. Here too, we recognise that there was probably an influencing bias. Patients may have been embarrassed to contradict us. On the other hand, our methodology did not follow the usual forms, since satisfaction was assessed using an anonymous questionnaire (Human Figure Drawing and CrownCrisp tests) as recommended by Castro Ferreira.[29] Our questions and the patients' answers were strictly verbal and not written. However, the 50% "very satisfied" rate seems encouraging to us.

Conclusion

Gigantomastia is a rare, benign and disabling condition, for which medical treatment remains ineffective in almost all cases. The aetiology may be primary or secondary to a benign breast tumour. Effective treatment therefore relies on surgery, for which there are several techniques. However, the technique of breast reduction with a superior-internal flap appears to be the most appropriate for this condition. It should be noted that this is a reconstructive and not an aesthetic surgery in our context. According to the literature, recurrence cannot be ruled out.

In our study, we had very few postoperative complications. Complications that most often occurred in patients with risk factors. However, the sample size was too small to draw any conclusions. We also note the possibility of a bias in the assessment not only of the quality of healing but also of the satisfaction of patients and surgeons, who were both operators and judges.

At the end of this work, we hope that women living in Gabon and suffering from gigantomastia will benefit from surgical management in order to improve their quality of life.

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Conflicts of interest

All authors declare that they have no conflict of interests.

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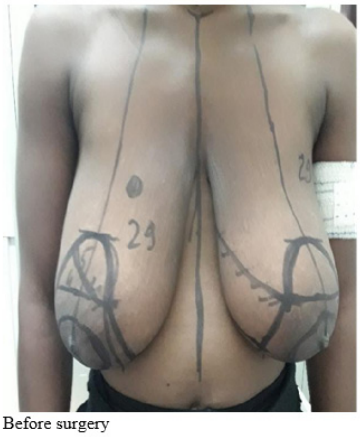
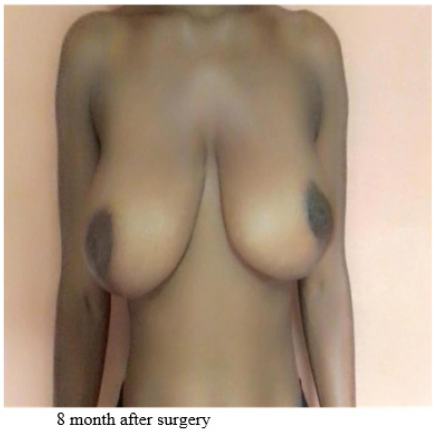
Appendices

Bilateral gigantomastia and tumour (right breast)

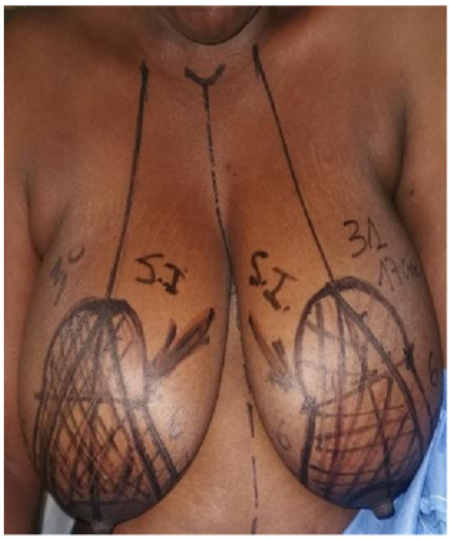


Before surgery

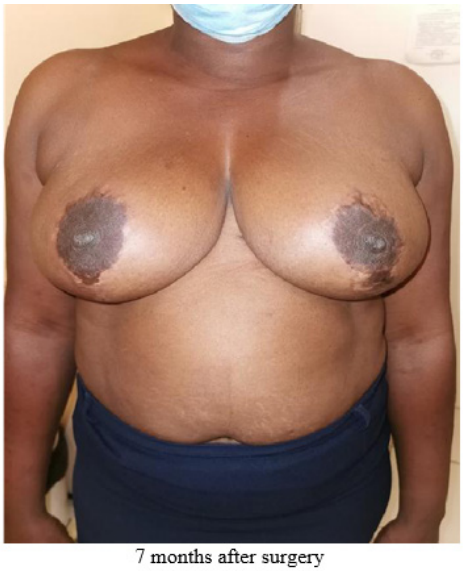


8 month after surgery

Bilateral gigantomastia



Before surgery



7 months after surgery