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Research Article

Management of Gestational Trophoblastic Disease: Case Presentations and Outcomes of Management at Mbingo Baptist Hospital, Cameroon

Prise en Charge de la Maladie Trophoblastique Gestationnelle : Présentation de Cas et Résultats de la Prise en Charge à l'Hôpital Baptiste de Mbingo, Cameroun

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ABSTRACT

Introduction. Mbingo Hospital, Cameroon sees a high proportion of women presenting with high risk gestational trophoblastic neoplasia (GTN). GTN is highly curable with appropriate diagnosis and treatment. The first objective of our study is to present two cases of women with Gestational Trophoblastic Disease (GTD) who attended Mbingo Baptist Hospital (MBH) and the second objective to more formally assess the outcomes of women with GTN. **Methodology**. This was a retrospective cohort study from 2011 to 2024 on all medical records of patients with GTN at Mbingo Baptist Hospital. **Results.** From 2011 to 2024, 57 women presented with an elevated βHCG and were diagnosed as low risk (WHO score <6) or high risk (WHO score ≥7). Mean age was 31.6 years old (range 19-53). The most common regimen for Low Risk (LR) disease was the 8 day alternating Methotrexate-Folinic Acid (19/32). Those not treated on this regimen generally were usually referred from other centers. The most common regimen for High Risk (HR) disease was EMACO (18/25). Five HR women went on to TPTE. Fifteen women had a hysterectomy. Some of the quality improvement issues we identified related to patient (ie., competing demands), hospital (ie., geographic location), providers (ie., lack of knowledge), national health care system (ie., lack of universal health care system, care pathways, protocols). **Conclusion.** GTN is a disease of young women and is very curable with appropriate diagnosis, treatment and follow-up. Governments need to consider including the costs for diagnosis and management of GTN within a universal health care package.

RESUME

Introduction. L'hôpital de Mbingo, au Cameroun, accueille une forte proportion de femmes présentant une néoplasie trophoblastique gestationnelle (NGT) à haut risque. La NGT est hautement curable avec un diagnostic et un traitement appropriés. Le premier objectif de notre étude est de présenter deux cas de femmes atteintes de maladie trophoblastique gestationnelle (MTG) qui ont fréquenté l'hôpital baptiste de Mbingo (HBM) et le second objectif est d'évaluer de manière plus formelle les résultats des femmes atteintes de MTG. **Méthodologie.** Il s'agit d'une étude de cohorte rétrospective de 2011 à 2024 portant sur l'ensemble des dossiers médicaux des patientes atteintes de la maladie trophoblastique gestationnelle à l'hôpital baptiste de Mbingo. **Résultats.** De 2011 à 2024, 57 femmes ont présenté une βHCG élevée et ont été diagnostiquées comme étant à faible risque (score OMS <6) ou à haut risque (score OMS ≥7). L'âge moyen était de 31,6 ans (de 19 à 53 ans). Le traitement le plus courant pour la maladie à faible risque était l'alternance de 8 jours entre le méthotrexate et l'acide folinique (19/32). Ceux qui n'ont pas été traités selon ce schéma ont généralement été adressés par d'autres centres. Le schéma le plus courant pour la maladie à haut risque (HR) était l'EMACO (18/25). Cinq femmes à haut risque ont été traitées par TPTE. Quinze femmes ont subi une hystérectomie. Certains des problèmes d'amélioration de la qualité que nous avons identifiés concernaient les patients (c'est-à-dire les demandes concurrentes), l'hôpital (c'est-à-dire la situation géographique), les prestataires (c'est-à-dire le manque de connaissances), le système national de soins de santé (c'est-à-dire l'absence de système de soins de santé universel, de parcours de soins, de protocoles). **Conclusion.** Le GTN est une maladie qui touche les jeunes femmes et qui peut être guérie grâce à un diagnostic, un traitement et un suivi appropriés. Les gouvernements doivent envisager d'inclure les coûts du diagnostic et de la prise en charge de la GTN dans le cadre d'un système de santé universel.

Table I. List of Anacronyms

ACTD	Actinomycin-D
βHCG	B Human Chorionic Gonadotropin
CBCHS	Cameroon Baptist Convention Health Services
CT	Computerized Tomography
D+C	Dilatation and Curettage
EMA	Etoposide, Methotrexate, Actinomycin-D
EMACO	Etoposide, Methotrexate, Actinomycin-D, Cyclophosphamide, Oncovin
EMR	Electronic Medical Record
EPEMA	Etoposide, cisplatin, Etoposide, Methotrexate, Actinomyin-D
FA	Folinic acid
GNI	Gross National Index
GTN	Gestational trophoblastic Neoplasia
HIC	High Income Country
HMIC	High Middle Income Countries
HR	High risk
LIC	Low income countries
LMIC	Low Middle Income Countries
LR	Low risk
MTX	Methotrexate
OR	Operating Room
TPTE	Paclitaxel, Cisplatin, Paclitaxel, Etoposide
U/S	Ultrasound
WHO	World Health Organization
WHP	Women's Health Program

KEY RESULTS

Aim of the Study

Present two cases of women with Gestational Trophoblastic Disease (GTD) who attended Mbingo Baptist Hospital (MBH) and more formally assess the outcomes of women with GTN.

Key Findings

1. From 2011 to 2024, 57 women presented with an elevated βHCG and were diagnosed as low risk (WHO score <6) or high risk (WHO score ≥7). Mean age was 31.6 years old (range 19-53).
2. The most common regimen for low risk (LR) disease was the 8 day alternating Methotrexate-Folinic Acid (19/32). Those not treated on this regimen generally were usually referred from other centers.
3. The most common regimen for high risk (HR) disease was EMACO (18/25). Five HR women went on to TPTE. Fifteen women had a hysterectomy.
4. Some of the quality improvement issues we identified related to patient (ie., competing demands), hospital (ie., geographic location), providers (ie., lack of knowledge), national health care system (ie., lack of universal health care system, care pathways, protocols).

Implications for Future Policies and Practices

Governments need to consider including the costs for diagnosis and management of GTN within a universal health care package.

INTRODUCTION

Delivery of health care in rural Africa is fraught with complexities. We will use our experience with the management of Gestational Trophoblastic Neoplasia (GTN) in northwestern Cameroon as a case study of hurdles that need to be overcome in delivery of curative management for GTN. GTN is an abnormality of the placenta which occurs predominately in young reproductive women. While molar pregnancy (a potential precursor to GTN) can be managed with evacuation of uterine contents; it is imperative that those contents be assessed pathologically and that the patient's βHCG serum marker be followed to determine resolution of disease. If the βHCG marker plateaus or rises, if the pathology shows choriocarcinoma or if the patient demonstrates metastatic disease, chemotherapy is required to achieve a cure. GTN is extremely sensitive to chemotherapy and was one of the first cancers that showed chemotherapy could be used to cure a cancer.

Cameroon is a country of 27 million people. Health services are provided by either government, private or confessional health care systems. The Cameroon Baptist Convention Health Service (CBCHS) is the largest confessional health system with 10 hospitals located throughout the country with affiliated community clinics. The CBCHS Women's Health program is a nurse led service initially developed to provide cervical cancer screening to the attendees. The WHP program also provides contraception management and providers are trained to perform manual evacuation for missed abortion (and less commonly molar pregnancies identified by ultrasound (U/S)). Cameroon has a low number of gynecologists, in fact there are only 8 gynecologists that work within the CBCHS. The medical oncology care of adult patients with cancer in the CBCHS is centralized at Mbingo Hospital in the northwest. Here access to chemotherapy drugs has been available since 2006. Currently there are 10 centers providing chemotherapy in Cameroon with a total of 13 medical oncologists in the country. Cameroon is predominantly a context where the patient pays for health care. In the circumstance of GTN, women are usually of young age, unemployed or involved in petty trade and present with vaginal bleeding. As a gynecologic oncologist (LE) from a high resource centre initial visiting (2016) and later residing at Mbingo, I kept bumping into care related issues for women with GTN. We undertook to more formally assess the outcomes of women with GTN who presented to MBH (retrospective cohort study).

PATIENTS AND METHODS

The medical records process at Mbingo involves logbooks which track patient visits to the clinic (WHP or oncology clinic), patient held book which contains patient health care information, a mirror chart in the oncology clinic, pathology and radiology reports typed in WORD and scanned into an Electronic Medical Record (EMR) database (REDCap), and paper based in patient hospital records. Anyone admitted to hospital has their demographic information entered into the EMR; however, medical records for ward patients are paper

based. Ward and Operating Room (OR) records involve logbooks. We culled these sources to identify patients with GTN from 2011-2023 (LE, DJ). In 2024 all cancer cases were prospectively captured at Mbingo in Kancertrack, a database built for a Quality Improvement project jointly funded by Bridges-Pfizer grant (Elit et al, 2023). Further data was entered into a template and then entered on an EXEL spreadsheet. For those patients where follow-up data was missing, DJ contacted them by cell phone to determine their disease status and whether they had any subsequent pregnancies. Ethical approval was obtained from the CBCHB Institutional Research Board (2022-49).

RESULTS

Clinical case 1

A 21-year-old Cameroonian woman had her first pregnancy at 18yo. It resulted in a miscarriage at 16-week gestational age. Three years later, she started family planning using Jadelle (progesterone insert). Two months later, she miscarried at 5 weeks gestational age. Two days later she had a manual evacuation at a Health Facility (Cost of at least 30,000cfs). This specimen was not sent to pathology. She continued to have vaginal bleeding. After a pelvic ultrasound showing retained products, she had a second D+C at a different facility where the family planning product was also removed. The specimen was not sent to pathology. Two weeks after this, she arrived at our facility with vaginal bleeding and a hemoglobin of 4.9 g/dL. She was given 2 units pRBCs. A pelvic ultrasound showed intrauterine products. She was taken for her third uterine evacuation. This specimen was sent for pathology. Initial βHCG was reported as >10,000 (Cost of 10,000csf). Dilutions were completed and value was 11,568 mIU/ml (Cost varies by the number of dilutions required). CXR negative. Pathology of the tissue from the third uterine evacuation confirmed choriocarcinoma. Her WHO score was = 1-2 (0 for age under 40 yo, 0-1 for a prior pregnancy of miscarriage or mole, 1 for βHCG level, 0-no metastasis, 0-size of disease, 0 no prior drugs). She was counselled regarding one of two treatment options: Methotrexate daily for 5 days or ActD one dose every 2 weeks. The patient had significant financial constraints especially as she had used much of her resources to pay for the 3 surgical interactions. Since she was staying with her sister 1.5 hrs drive from the hospital and we are in a conflict zone, the patient elected to have ActD. Due to the generosity of an internation donor, her first dose was given. This case highlights the importance of all tissue needing to be sent for tissue analysis, having a high suspicion of disease, checking Rh status and the need to follow βHCG values post intervention. The importance of referral to a more specialized facility for these tests and evaluation is critical if the patients are to survive their disease.

Clinical case 2

This 49 Yo woman had a hysterectomy bilateral salpingo-ophorectomy 5 months prior at another facility. The final pathology showed a complete mole. She had presented numerous times post operatively with vaginal bleeding. Prior to being seen at our health facility she reports that she was taken to the OR. She was admitted with bright red vaginal bleeding. Her βHCG was 24,000. She was taken to the OR. After induction of general anaesthesia, we identified 4 sponges in the vagina (Cost of EUA is 30,000-50,000cfs). There was a 7 cm mass arising from the posterior lower to mid vagina that was bleeding actively and bright red. The presumptive diagnosis was a vaginal metastases from GTN and the patient was given transexamic acid and packed with 2 lap sponges. Patient had a chest abdominal pelvic CT scan that day (Cost of 100,000cfs). It showed innumerable lung metastases the largest being 2 cm. No other metastatic disease. WHO score was at least 10 (1 for age over 40yo, 1 – molar pregnancy, 2-βHCG > 10^4, 0- lung and vaginal metastases, 2 – 7 cm size of vaginal metastasis, 4 – innumerable number of metastases, 0-no prior chemotherapy). CT head was not done as patient did not have any neurologic symptoms and due to cost. Patient was counselled and started that evening on Day 1-2 EMA. Plan is for patient to receive alternating etoposide, methotrexate and actinomycin with cyclophosphamide and vincristine (EMACO). Sponges were removed at 24 hours and patient had no further bleeding. At cycle 2, the vaginal mass had been absorbed leaving a shallow ulcer with rolled edges. βHCG was 312 iu. Quantitative βHCG will be done every 2 cycles due to cost. Goal is 3 cycles of treatment after normal bHCG. Patient has been counselled not to be sexually active until the vagina heals. She will have a pelvic examine every 2 weeks.

This case highlights the need for follow-up βHCG values after any procedure for evacuating molar tissue and observing the patient for a minimum of 6 months to ensure resolution of these values.

Patient review

For the period of 1Jan2011-31Dec2024, there were 59 women identified with GTN (LR or HR) (Elit et al, 2022) but two oncology charts were missing so we report on 57 women. The oncology unit saw from 1-5 women with GTN per year (initially the mean was 3/year but an increase to 5/year seen since 2020) (Figure 1). The women ranged in ages from 19-53 years old, with the mean age of 31.6 years. We did not uniformly document the patient's stage or WHO score: FIGO stage was only recorded for 15 women and WHO score only for 10, Both in 20 and neither in 8 (61% and 52% respectively). A stage or WHO score was more likely to be recorded for those with HR disease.

Four women with GTN were known to be HIV positive. One presented with LR disease and the other three with HR disease. All women ultimately required EMACO and two have died of their disease with two being alive and well at last contact.

There were 32 women who were treated initially with LR regimens but in only 16 (50%) women was a WHO score available. Mean age was 30.1 years with a range from 21-53 years. Four women had a hysterectomy prior to starting chemotherapy with final pathology showing choriocarcinoma in 3 and a complete mole in 1. The chemotherapy regimens used were: 8 day alternating

MTX and FA (n=19), daily MTX (0.3mg/kg/day for 5 days q2weeks) (n=2), ActD (1.2mg/m2 q2weeks) (n=2), EMA x 1 cycle (n=2), MTX (30mg/m2 IM q2wk) (n=2) and MTX alone unknown regimen(n=5) (Table 1).

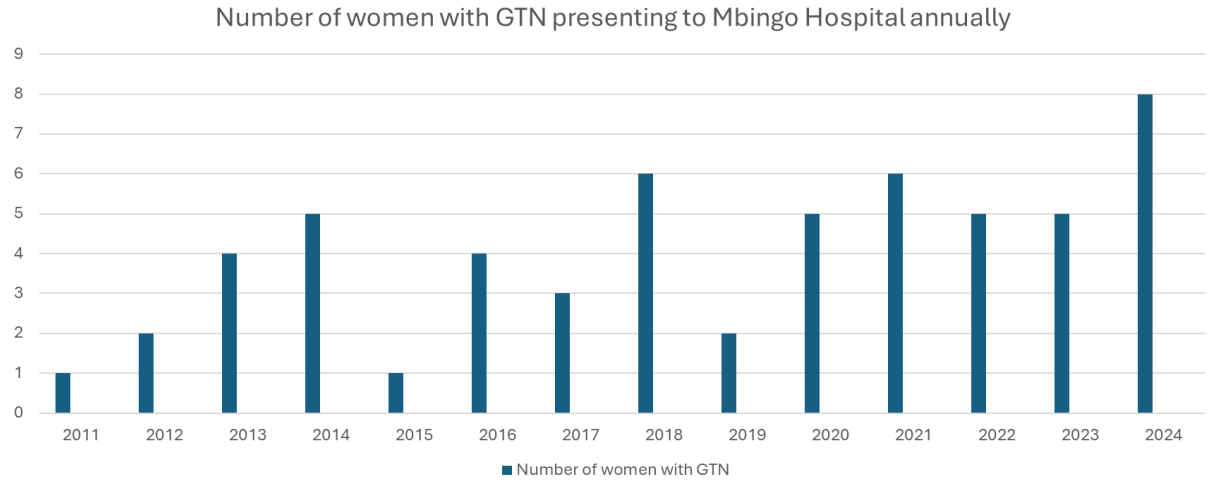

Figure 1. Number of women with GTN presenting to Mbingo annually

Table 2. Management and outcomes for women with low risk disease by WHO score

WHO score	βHCG negative at the end of treatment				βHCG elevated or unknown at the end of treatment			
	Alive	Dead	Lost to Followup	In progress	Alive	Dead	Lost to Followup	In progress
Single Agent								
Methotrexate	3		1		3	1	4	1
Actinomycin D	1						1	1
Single->Single							1	
Single-> MTXActD							1	
Single->Multiagent	1		2			4		
EMACO							2	
Single->Single->Multiagent	1							
Single->Multiagent->Multiagent	1				1	2		
Total	7		3		4	7	9	2

Table 3. Management and outcomes for women with highrisk disease by WHO score or FIGO stage

WHO score or FIGO stage	βHCG negative at the end of treatment				βHCG elevated or unknown at the end of treatment			
	Alive	Dead	Lost to Followup	In progress	Alive	Dead	Lost to Followup	In progress
EMACO	3					3	5	1
MTX->EPEMA or EMACO	1		1				1	
EPEMA->EMACO	1	1						
EMACO->TPPE					1		4	
EMACO->Iphos Etoposide	1							
TPPE->EMACO							1	
TPPE->EMA->TPPE							1	
Total	6	1	1		1	3	12	1

Those women who presented initially to Mbingo Hospital were usually treated with the 8-day alternating regimen (and more recently the daily MTX for 5 days or Act D). Those women who presented to other centers and were then referred to Mbingo Hospital, came with exposure to single agent and single dose of MTX. Three of the women transitioned from their first regimen to a regimen with ActD and eight (25%) women transitioned to EMACO. Three women went on to third line TPTE.

The mean number of cycles of chemotherapy for women with LR disease was 2.7 (range 1-9). There were three women who completed first-line chemotherapy with a negative βHCG and the mean number of cycles was 5.8 (range 2-9). In eleven women, they defaulted from

chemotherapy with an elevated βHCGC after 1 cycle (n=3), 2 cycles (n=5), 3 cycles (n=3). In our setting this is usually related to inability to pay or lost to follow-up once symptoms are relieved. There were 12 women who transitioned from a LR regimen to a HR regimen (like EMACO) usually after 1-2 cycles of the LR regimen (Table 1). Its not clear if this was the initial intent (ie., start treatment gently not to start major bleeding, stabilize the patient for transport, lack of knowledge or lack of access to appropriate drugs) or access to further imaging that later up stages the patient.

There were 25 women with HR disease of which 22 women were treated upfront with combination chemotherapy (Table 2). Their mean age was 33.7 year with a range of 19-49 years. The regimens used were: EMACO (18), EPEMA (2), TPPE (2). Three HR patients were so unwell they received 1-2 cycles of single agent MTX before EMACO. Of the 8 who completed EMACO therapy with at least 2 negative βHCGs, 3 are alive. Of the 20 women who received EMACO or EPEMA, 5 went on to TPPE after a mean of 5.7 cycles (Range 2-9) of EMACO. Number of TPPE cycles was a mean of 1.7 cycles (Range 1-2).

In addition, there were 12/32 (37.5%) initially LR patients who went on to received EMACO or TPPE (Table 1). In this group the number of cycles was 4.3 (range 3-7) before making the transition. Ten of the LR patients were known to have a negative βHCG at the end of treatment and 7 of these at alive and well with 3 lost to follow-up. Four patients went on to require third line TPPE, two died and two are alive and well.

There were 15 women who had a hysterectomy at some point in their management. Those initially classified as Low risk (8/15): 4 had TAH prior to chemotherapy (with 3 choriocarcinoma and 1 complete mole), 1 had 1 dose of MTX prior to TAH for choriocarcinoma, 2 had a hysterectomy during treatment (before changing type of chemotherapy) and 1 at the end of treatment. Those initially classified as High risk (7/25): 3 had TAH before treatment (1 invasive mole, 1 complete mole and 1 choriocarcinoma), one woman had one cycle MTX and she was found to have a uterine ruptured and a TAH was done. One hysterectomy was done during treatment. One hysterectomy was done after transitioning from EMACO but before starting TPPE. One hysterectomy was done at the end of EMACO treatment.

Outcomes

In the LR population (Table 1) only half of the patients had a known/recorded βHCG at their last treatment. A third of the patients were lost to follow-up. In the HR population (Table 2), only 1/3 of the patients had a negative βHCG at the end of treatment. Roughly half of the patients with lost to follow-up.

DISCUSSION

Review of Structures and Processes

Knowledge deficit in Health Care Providers

GTN is a relatively uncommon disease compared to common surgical issues like appendicitis. The practice of following up a patient's quantitative βHCG after a molar pregnancy does not appear to be practiced in this country whether due to lack of knowledge on the part of the health care team, long delays in pathology results, fragmented care or lack of follow-up and/or inability to pay by the patient. In Cameroon, due to the low number of Medical Council approved physicians and extremely low number of surgeons, the needs of the population are often met by nurses and operating room technicians (and/or traditional practitioners).

Table 3. Protocol for βHCG monitoring

Post evacuation for tissue that shows a molar pregnancy (complete mole, partial mole)
1. Do weekly serum quantitative βHCG levels until they are less than <1 (or the lowest limit of detection considered normal in your lab).
2. Once the values are negative continue testing monthly for 6 months before patient is allowed to get pregnant
3. All women in this situation should be on some form of birth control for the duration of monitoring.
Post treatment for low-risk disease (WHO 6 or less)
1. Do weekly serum quantitative βHCG levels until they are less than <1 (or the lowest limit of detection considered normal in your lab).
2. Once the values are negative continue testing monthly for 12 months before patient is allowed to get pregnant
3. All women in this situation should be on some form of birth control for the duration of monitoring.
Post treatment for high-risk disease (WHO score 7 or higher)
1. Do weekly serum quantitative βHCG levels until they are less than <1 (or the lowest limit of detection considered normal in your lab).
2. Once the values are negative continue testing monthly for 24 months before patient is allowed to get pregnant
3. All women in this situation should be on some form of birth control for the duration of monitoring.
Even women having had a hysterectomy for molar pregnancy or LR or HR disease need βHCG monitoring as described above.

This may in part explain the less-than-ideal practice of good quality of care. In our second case, the pathology was reported within the month. It was clear that the patient had no quantitative βHCG follow-up likely based on a knowledge deficit by the general surgeon (ie., not aware of the need for patient to be monitored after the diagnosis of complete mole), fragmented care (ie., the surgeon or technician only does procedures and patient follow-up is left to other providers who may or may not understand the disease) or lack of return for follow-up by the patient. In the first case presented, it appears that care was reactive rather than pro-active. The health care team did not appear to understand the need for follow-up of the qualitative HCG or quantitative βHCG and referral for medical management if these did not normalize post-evacuation. It is true that quantitative βHCG values may

not be readily available in many locations, but a repeatedly positive pregnancy test should result in a patient referral to a higher-level facility. A protocol for quantitative βHCG follow-up is provided in table 3.

Patient borne costs

There is no universal health care coverage for women with GTN in Cameroon. By and large, in the west part of the country, it is a pay for care system with few exceptions like childhood vaccinations. Universal health coverage was launched in Cameroon in April 2023. Phase 1 aims to increase use/access to services for malaria treatment for children under 5 years, pregnancy women, people living with HIV. Unfortunately, non-communicable diseases are not a part of this initiative. There is the beginning of a private health insurance system in the large urban centres where the cost is contributed to a health insurance company through large company employers. The diagnosis of GTN involves several consultations, tests and possibly procedures. As documented in the charts, women frequently indicated that they are unable to pay for the tests. Physicians needed to make choices to do a less detailed test such as a U/S abdomen pelvis (14,000cfa or $28 USD) instead of a CT Abd Pelvis (90,000cfa or $180 USD). Often tests are deferred or not done at all. For example, it is uncommon to get a CT head in those with chest metastases unless the patient is symptomatic. This less than complete staging information may result in down staging the patient and giving a LR regimen for a period of time only to find that the βHCG is not responding and patient requires a HR regimen.

After diagnosis there is the cost of chemotherapy. An 8-day coarse of Methotrexate and Folinic Acid is 40,000cfa or $80USD. Mbingo Hospital had a 50% reduction in chemotherapy costs due to access to an Mbingo Hospital Adult Cancer Fund, yet many women still cannot raise funds to complete the prescribed treatment. Funds for health care are borne by the patient herself or the family unit.

CBCHS Women's Health Program

Having a gynecologic oncologist consistently on site in the Mbingo WHP allowed the nursing staff to recognize variations in what I (LE) was requesting for patient care and practices that predated my presence. Practices of counselling for birth control for the first 6-12 months after a molar pregnancy and requiring post evacuation βHCG monitoring were novel. Through the CBCHS WHP, these practices became standardized throughout their network across the country. Patient care issues throughout the CBCHS WHP were brought back to Mbingo Hospital for disposition planning. The serum quantitative βHCG cost is 10,000 cfa ($20USD). If the sample requires dilutions the cost is higher depending on the number of dilutions required. Repeated patients noted difficulty finding the funds and so we agreed to less frequent monitoring compared to a high-income country (HIC) setting. Many health care centers in Cameroon do not send tissue from manual evacuation for pathologic analysis. In part, this is a cost issue, but also a problem with access to pathology. There are only 6 pathology labs in the country. It is mandatory at Mbingo Hospital for all tissue obtained in the WHP or operating room to go for pathologic assessment. We are trying to encourage this practice through-out the CBCHS.

Mbingo Baptist Hospital (MBH)

4a. Laboratory

A recurring complaint from the medical staff at our facility is the lack of ability to get an actual number for the quantitative serum βHCG. One could get a value reading "greater than 300" or "greater than 10,000" but this does not help making management decisions such as determining if the treatment is working from one chemotherapy visit to another. The hospital has a COBAS machine. It took sitting with the laboratory personnel and reading the minutia in the massive product monograph catalogue to understand that the cartridges being used were for genetic testing (i.e., Down's syndrome) and not for the intent the health care staff required. This was rectified in 2021. Some of our current issues are that the COBAS machine may be "out of service" on the day a woman presents and so her sample cannot be analyzed. One needs to order "quantitative βHCG with dilutions" if you want an absolute value in part due to the cost of the test to the patient. If you catch a report reading "greater than 10,000", a call to the lab director can get the appropriate test performed.

4b. Medical records

The patient carries their health care book at all times. This system makes it difficult to identify and track cases. For example, a patient's name may be spelled differently on multiple records. There is no national unique identifier in Cameroon. The hospital currently has an EMR system only for in-patients.

4c. Pharmacy

Securing a stable drug supply is another issue. Access to etoposide has been especially problematic. Thus, physicians have made decisions to give Platinum Taxol instead of waiting to start EMA.

Patient related

5a. Other social constraints

Women with GTN are reproductive aged women with other family commitments like care of children, parents and gardens to keep for food for the family. Treatment of the seemingly well affected individual is often of lower priority. Given GTN is very chemo sensitive, once a woman feels the slightest improvement after the first few chemotherapy sessions, they may interrupt their treatment to attend to these other competing demands. This may contribute to the development of methotrexate resistance and the need for subsequent lines of combination chemotherapy when they return with worsening symptoms.

5b. Geographic isolation

Mbingo Hospital is located an hour drive north of Bamenda. Since 2018, this has been a region of civil unrest which adds to the complexity of patients being able to access care. What does this mean? Patients may encounter road blocks, extended road closures, kidnapping, higher than normal taxi fees, extra fees and the like. A bus was donated to Mbingo Hospital which

allows patient to travel up to 3 times a day from Bamenda to Mbingo return. This has minimized but not eliminated some of the access barriers.

Issues in Africa

In Africa, the delivery of care to women with GTN will depend on the context in which they live. In this paper, we highlight the outcomes of care for women with GTN who live in rural Cameroon and attend Mbingo hospital in northwest Cameroon, a private pay confessional facility. In Africa, there are examples of exemplary care and outcomes for women with GTN like that described by Partners in Care for the Butaro Cancer Centre of Excellence in Rwanda (Nzayisenga et al, 2016). However, even they acknowledge that their model works because the cost of care is offset for the poor.

There are many factors that contribute to health. Kruk et al 2018 in the Lancet Report on Quality of Care describe that the pillars holding up health care including the population, governance, platforms, workforce and tools. Population includes the individuals, families and communities that produce and use the system. Governance includes the leadership, financing and intersectoral aspects (like water and hydro) that support health care. Platforms include number and type of facilities. Workforce includes the health care team and support workers. Tools include the hardware and medicines.

We acknowledge that a country's economics is definitely a component to access to health care. Africa is made up of 54 countries: 34 are LIC (<1,085 GNI) like Rwanda, 16 LMIC (1,085-4,253 GNI) like Cameroon, 10 HMIC (4,254-13,205) and 1 HIC (World Bank, 2022). Patient's ability to pay is defined by their financial resources and those are mostly defined by those in country. Contribution of central government to the cost and planning of health care again are influenced by the economics and priority setting of the central government. Access to Universal health care coverage improves care for the patient, satisfaction for care delivery in the team and smoothing of process issues for all aspects in care delivery. The focus becomes best care for the patient rather than letting "who will pay?" govern management. There are 11 African countries with free or universal health care including Rwanda (Wikipedia, 2022). Difficulty in paying for services in GTN has been discussed not only in our paper but also by other authors (Gueye et al, 2010).

Access to trained healthcare staff, laboratory and radiologic tests and stable supply of current dated pharmaceutical treatments is also critical (Vanderpuye et al 2019). It is well known that Africa has a extremely high population to physician ratio and access to subspecialist care (like gynecology, pathology, oncology) is also problematic (Zubizarreta et al 2015, Nelson et al, 2016 Rosen et al, 2017). Aspects that would further facilitate and optimize GTN care would include centralized care (Gueye et al, 2016, Nzayisenga et al 2020). Such advocacy could prioritize advocacy for efficiency, drug access, and timely quantitative βHCG monitoring.

CONCLUSION

GTN is a disease of young reproductive aged women, and it is extremely preventable or curable with appropriate diagnosis, treatment and follow-up. Leadership within governments and the health care sector need to consider including the relatively low cost for diagnosis and management of GTN within a universal health care package. Appropriate referral to sub-specialty physicians is vital for optimal individual patient care and survival.

Authors Contributions

Project design – LE, FK, NT.
Chart review and data abstraction – LE, JD.
Cases - all. Results – LE, FK, NT.
Review of issues in management – all.
Manuscript review – all.

Interest

Any health care provider who manages women with pregnancy, pregnancy related complication, oncologic disorders.

Merits

First article that we are aware of in Cameroon addressing the outcomes of women with GTN.

Conflict of interest

None

REFERENCES

1. Elit L., Kouya-Tchintseme F., Jaff D. (2022) GTN in a setting where the patient has to pay: Mbingo Baptist Hospital, Cameroon. Presentation at the 2022 ISSTD meeting
2. Elit L, Kouya-Tchintseme F, Mbah G, Palmer D, Streatfeild K, Adams M. (2023) Quality Improvement through improving data management and patient navigation through the cancer journey. Pfizer Bridges Foundation Grant.
3. Gueyer M., Ndiaye-Gueye M.D., Kane-Gueye S.M., Gassana O., Diallo M., Moreau J.C. (2016). Diagnosis, treatment and outcomes of Gestational Trophoblastic neoplasia in Low resource income countries. Int J Of MCH and AIDS 5(2),112-118.
4. Gueye M., Ndiaye M.D., Diallo M., Mbodji A., Gueye S.M.K., Moreau J.C. (2010). Management of gestational trophoblastic diseases in a low resource country: establishment of a national center and its results. Med Sante Trop 1:29(2),213-219.
5. Kruk M.E., Gage A.D., Arsenault A., Jordan K., Leslie H.H., Roder-DeWan S., et al. (2018). High-quality health systems in the sustainable development goals era: time for a revolution. Lancet 6, e1196-252.
6. Nelson A.M., Milner D.A., Rebbeck T.R., Iliyasu Y. (2016). Oncologic care and pathology resources in Africa: Survey and recommendations. J Clin Oncol 34(1),20-6.
7. Nzayisenga I., Segal R., Pritchett N., Xu M.J., Park P.H., Mpanumsingo E.V. et al. (2016). Gestational Trophoblastic Neoplasia at the Butaro Cancer Centre of Excellence in Rwanda. JGO 2(6),365-74.

8. Rosen B., Itsura P., Tonui P., Covens A., van Lonkhuijzen L., Orang'o E.O. (2017). Development of a comprehensive and sustainable gynecologic oncology training program in western Kenya, a low resource setting. Gyn Onc Reports 21,122-7.
9. Vanderpuye V., Hammad N., Martei Y., Hopman W.M., Fundytus A., Sulliva R., Seruga B., Lopes G., Sengar M., Brundage M.D., Booth C.M. (2019). Cancer care workforce in Africa: perspectives from a global survey. Infectious Agents and Cancer 14,11-19.
10. List of African Countries with Free or Universal Health Care. https://en.wikipedia.org/wiki/List_of_countries_with_universal_health_care. (Accessed 13Sep2022).
11. World Bank countries and lending groups. https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups. (Accessed 13Sep2022).
12. Zubizarreta E.H., Fidaroza E., Healy B., Rosenblatt E. (2015). Need for radiotherapy in low and middlie income countries – the silent crisis continues. Clinical Oncology 27,107-114.