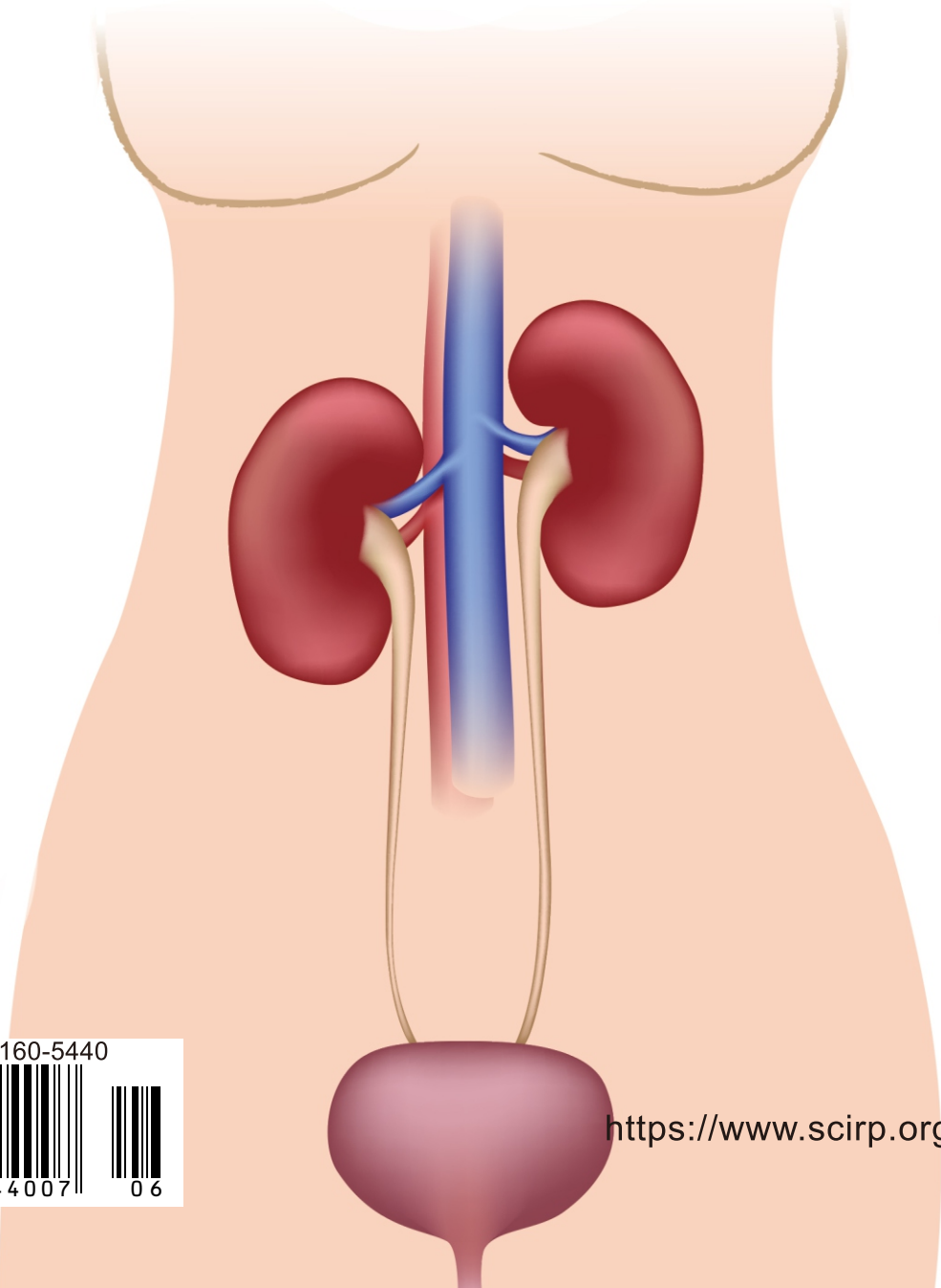


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Epidemiology of Urological Emergencies at the Regional University Hospital Center of Ouahigouya, Burkina Faso

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Abstract

Introduction: Urological emergencies are less frequent compared to other emergencies, particularly traumatological and digestive emergencies. The objective of this study was to determine the epidemiological profile of urological emergencies in a regional hospital in Burkina Faso. **Patients and methods:** This was a cross-sectional study of urological emergencies admitted to the Surgical Department of the Ouahigouya Regional University Hospital in Burkina Faso over a period of 41 months. The study covered a 41-month period from March 2015 to July 2018. Ethical clearance was taken from the institutional ethics committee. **Results:** Urological emergencies accounted for 3.7% of all emergencies. The mean age of the patients was 56.59 ± 25.93 years (range 1 year - 95 years). The sex ratio was 12.05. Bladder urinary retention was the main urological emergency in 48.28% of cases. Suprapubic cystostomy was the most performed surgical procedure (56.25%) followed by debridement of external genitalia gangrene (27.68%). **Conclusion:** Urological emergencies occupy a significant place in our work context. An increase in the number of urologists would improve their management.

Keywords

Epidemiology, Urological Emergencies, Retention, Cystostomy

1. Introduction

Emergency very often rhymes with suffering for the patient and those around him, hence the need for rapid treatment [1]. Urological emergencies are less frequent compared to other surgical emergencies, notably trauma and digestive

[2]. Their care is an important part of the activity of a urology service [3] [4]. However, this activity is often underestimated in the urology departments [5]. It is therefore understandable that it is even more underestimated in the services that accommodate all emergencies. In Africa there is generally no individualized unit for the management of urological emergencies. In several studies, bladder retention appears to be the most common urological emergency [3] [4] [6]. These urological emergencies mainly concern the elderly. This therefore requires special attention in the therapeutic approach. Also, it should be noted that there is a lack of urologists in some African countries. The objective of this work was therefore to determine the epidemiological profile of urological emergencies in a regional hospital in Burkina Faso.

2. Patients and Method

This was a cross-sectional retrospective study of urological emergencies admitted to the surgery department of the regional university hospital center (CHUR) of Ouahigouya in Burkina Faso. The study covered a 41-month period from March 2015 to July 2018. Data were collected from hospital records, operative report registers and patient records. The variables studied were age, sex, profession, type of emergency and type of gesture performed. The data was analyzed using Statistical Package for the Social Sciences (SPSS) software in version 21.0. The figures and tables were produced using Excel 2013 software.

Ethical clearance was taken from the institutional ethics committee.

3. Results

We collected 261 urological emergencies during the study period, or an average of 76.39 urological emergencies per year. Urological emergencies accounted for 3.7% (261/7050) of all surgical emergencies admitted during the study period. The mean age of the patients was 56.59 ± 25.93 years with extremes of 1 year and 95 years. In our series, 52.49% (137/261) of the patients were at least 60 years old. The sex ratio was 12.05. Farmers were the most represented socio-professional category in 46.4% of the cases. Bladder retention was the main urological emergency in 48.28% of the cases.

Table 1 provides a breakdown of the different types of urological emergencies.

Prostate tumor was the primary etiology of urinary bladder retention in 89.68% of cases.

Figure 1 shows the distribution of patients according to the etiology of urinary bladder retention.

Table 2 shows the distribution of patients according to the etiology of urinary bladder retention.

Bladder tumor was the main etiology of total hematuria in 78.95% (15/19). Urogenital trauma accounted for 6.51% of urological emergencies. Trauma to the urethra accounted for 47.06% of urogenital trauma. One hundred and twelve (42.91%) patients underwent surgery. The suprapubic cystostomy was the most performed surgical procedure (56.25%) followed by debridement of gangrene of

the external genitalia (27.68%).

Table 3 gives the distribution of patients according to the surgical procedure performed.

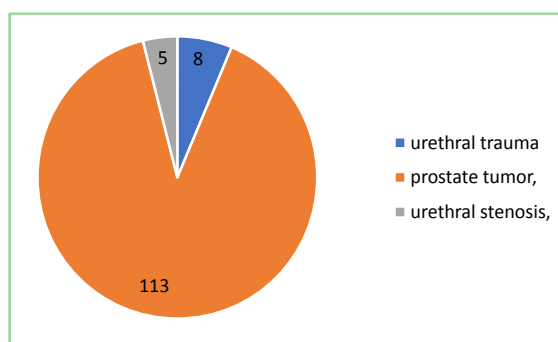


Figure 1. Étiology of urine retention.

Table 1. Distribution of patients by type of urological emergency.

Type of emergency	Effective	Percentage (%)
Bladder retention of urine	126	48.28
Urogenital infections	52	19.92
♣ Fournier gangrene	31	11.88
♣ Acute orchiepididymitis	12	4.6
♣ Acute pyelonephritis	4	1.53
♣ Hydrocele infected	3	1.15
♣ Acute prostatitis	2	0.77
Renal colic	30	11.49
Total hematuria	19	7.28
Spermatic cord twist	11	4.21
Urogenital trauma	17	6.51
Priapism	5	1.91
Complication of circumcision	1	0.38
Total	261	100

Table 2. Distribution of patients according localization of urological traumatism.

Geste	Effectif	Pourcentage (%)
Uretral trauma	8	47.06
Renal contusion	3	17.65
Bladder rupture	3	17.65
Closed scrotal trauma	1	5.88
Penis trauma	2	11.76
Total	17	100

Table 3. Distribution of patients according to the surgical procedure performed.

Act	Effective	Percentage (%)
Suprapubic cystostomy	63	56.25
Debridement	31	27.68
Scrotal exploration/orchidopexy	11	9.82
Al-Ghorab	5	4.46
Exploration-suture scrotal wound	2	1.78
Total	112	100

4. Discussion

Urological emergencies accounted for 3.7% of all surgical emergencies admitted to the surgical department during the study period with an average of 76.39 cases per year. This result is similar to that reported by Mpirimbanyi in Rwanda who estimated the frequency of urological emergencies at 5.3% in a general surgery department [7]. However, Diabaté and Diallo estimated respectively at 15.80% and 22% the share of urological emergencies in urological consultations. These two authors also reported an average of 140.9 cases/year and 253.33 cases/year respectively [1] [3]. In fact, these two authors conducted their study in a urology department. This is not the case in our hospital where there is no individual unit for the management of urological emergencies. All surgical emergencies are therefore admitted to a single surgery department. It should be noted that certain urological emergencies such as urinary bladder retention are often taken care of in peripheral health facilities before being referred to the CHUR for external consultation. Anything that reduces the number of urological emergencies we receive.

The average age of our patients was 56.59 years. This result is similar to that reported in several studies. Martin in France reported an average age of 57 years [4]. In Africa Diallo, Diabaté and Fall reported an average age of 56, 59 and 58.8 years, respectively [1] [3] [6]. Prostatic pathologies are responsible for the majority of urological emergencies and occur beyond the fifth decade [6] [8].

We noted a clear male predominance in our series with a sex ratio of 12.05. Indeed, this male predominance is reported in almost all studies on urological emergencies [2] [5] [6] [9] [10]. This is linked to the high frequency of emergencies linked to urethro-prostatic pathologies [3].

Urinary bladder retention was the most frequent urological emergency in our series with 48.28% of cases. In the literature, the same observation has been made by several authors. Diallo and Fall reported a frequency of 73.9% and 60.6% respectively [1] [6]. Also, in Martin's study bladder retention was the first urological emergency with 24.11% of cases [4]. Bladder retention of urine is the main reason for the discovery of prostate tumors [6]. In Africa, patients generally consult health facilities only at the stages of complications due to certain socio-economic and cultural constraints [6]. The first symptoms of the prostate tumor do not generally worry the patient. Also, what affects the urogenital system is often considered taboo by the elderly subject.

Urogenital infections ranked second in our series with 19.92% of cases. Diabaté reported a similar result (19.80%) [3]. On the other hand, in the Topaktas series in Turkey, urogenital infections represented the first urological emergency [10]. Gangrene of the external genitalia accounted for 59.61% of these urogenital infections in our series. It is a rapidly progressive necrotizing fasciitis of the perineum and external genitalia resulting from a polymicrobial infection [11]. His prognosis remains serious despite the progress of resuscitation. The mortality rate varies between 16% and 40% and can reach 80% in certain series [12] [13].

Kidney colic was the third urological emergency in our series with 11.5% of

cases. In the Diallo series, she only came in fourth position [1]. By cons in the series of Topaktas and Martin it represented the second urological emergency [4] [10]. In India renal colic was the first urological emergency in Talreja's study [2]. In France renal colic represents approximately 1% to 2% of the reasons for consultation in the emergency services [14].

Total hematuria represented 7.28% of the reasons for consultation in our series. This result is comparable to that reported by Fall in Senegal which was 7.1% [6]. Hematuria is the main sign of bladder tumors [15]. The bladder tumor was the first cause of hematuria in our context, the country being located in an area of bilharzian endemic.

Twist of the spermatic cord accounted for 4.21% of urological emergencies in our series. Martin, Tfeil and Fall respectively reported a frequency of 0.8% 2.92%, 2.8% [4] [5] [6]. The average age of the patients was 22.18 years with extremes of 5 years and 43 years. Twisting of the spermatic cord can occur at any age, but the average age of onset is between 16 and 22 years. Which corresponds to the average age in our series [16].

Urogenital trauma accounted for 6.51% of urological emergencies in our series. Trauma to the urethra was the most common (47.06%). Our result is comparable to that of Diallo which reported a frequency of 7% [1].

The most performed surgical procedure in our series was suprapubic cystostomy in 24.1% of the cases. Tfeil in Mauritania, Fall in Senegal and Topaktas in Pakistan made the same observation with 59.67%, 59.8% and 22.3% of cases [5] [6] [10]. In Burkina Faso, suprapubic cystostomy accounted for 77.5% of surgical procedures performed in urological emergencies [17]. In the same study, Zango reported 5 cases of peritoneal breach during suprapubic cystostomy, including one case of generalized acute peritonitis which led to the patient's death. It was a cystostomy performed under local anesthesia [17]. In other words, it is far from trivial. The suprapubic cystocatheter has less morbidity than a cystostomy. However, it is not widely used in our context due to its unavailability. Also, compliance with the rules of catheterization by students and nurses could help reduce the indications for suprapubic cystostomy. It is generally difficult surveys that arrive at CHUR, the other bladder retentions being taken care of in peripheral health units.

5. Conclusion

Urological emergencies occupy a significant place in our work context. As in most studies, bladder retention is the most common urological emergency. Our study shows that it is the elderly who are mainly concerned. An increase in the number of urologists would improve the handling of these emergencies. Also, the creation of a specific unit for urological emergencies will relieve the emergency reception service.

Conflicts of Interest

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

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Gangrene of the External Genitalia at the Regional University Hospital Center of Ouahigouya: Epidemiological Profile and Therapeutic Aspects

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Abstract

Introduction: Gangrene of external genitourinary organs is a rapidly progressive necrotizing fasciitis of the perineum and external genitalia that results from a polymicrobial infection. Mortality remains high despite advances in resuscitation. We report the experience of the surgery department of the Regional University Hospital Center (CHUR) of Ouahigouya in order to describe the epidemiological profile and the therapeutic aspects of GOG. **Patients and methods:** We carried out a descriptive and analytical retrospective study collecting 41 cases of Fournier's gangrene treated over 63 months (from March 2013 to July 2018) in the surgical department of the Ouahigouya regional university hospital center. Ethical clearance was taken from the institutional ethics committee. **Results:** The mean age of the patients was 65.02 ± 17.92 years with extremes of 23 years and 95 years. All patients were male. Urologic causes were the most common with 36.58% of cases. The average consultation time was 15.44 ± 16.04 days with extremes of 1 day and 60 days. All patients received resuscitation, bi or triantibiotherapy and surgical debridement. The mortality rate was 24.39%. The mean duration of hospitalization was 10.83 ± 6.257 days with extremes of 1 day and 60 days. **Conclusion:** The Fournier's gangrene always has a very high lethality. Improving the prognosis requires fast and effective management.

Keywords

Fournier's Gangrene, Epidemiology, Emergency, Mortality

1. Introduction

Fournier external genitalia gangrene (GOG) is a rapidly progressive necrotizing fasciitis of the perineum and external genitalia that results from polymicrobial infection [1]. In 1883 a French dermatologist named Jean Alfred Fournier reported five cases of gangrene of the external genitalia with no apparent cause in young men. This disease was called gangrene of Fournier [2]. The source of the infection can be urological, proctological or dermatological. However, in about 5% of cases GOG is said to be idiopathic [1]. It is a rare urological emergency that can quickly put life threatening into play. Mortality remains high despite progress in resuscitation. It is estimated between 16% and 40% [3]. Management must be rapid and effective [4]. We report the experience of the surgery department of the Regional University Hospital Center (CHUR) of Ouahigouya in order to describe the epidemiological profile and the therapeutic aspects of GOG.

2. Patients and Method

This was a descriptive and analytical retrospective study of 41 patients treated over a period of 63 months (from March 2013 to July 2018) in the surgical department of CHUR Ouahigouya in Burkina Faso. Data were collected from hospital records and patient records. Epidemiological (age, sex, profession), diagnostic (time to consult, clinical examination on admission, biology), therapeutic (resuscitation, antibiotic therapy, debridement) and evolutionary (duration of hospitalization, survival) were studied. The statistical analysis was performed by the Statistical Package for the Social Sciences (SPSS) software in version 21.0. The tests used were Student's t test and Fisher's exact test. $P < 0.05$ was considered statistically significant. The figures and tables were produced using Excel 2013 software. The confidentiality of the data was respected.

3. Results

During the study period, we collected 41 cases of GOG, an average of 7.8 cases per year. GOG accounted for 0.54% (41/7617) of all admissions during the study period. The mean age of the patients was 65.02 ± 17.92 years with extremes of 23 and 95 years. **Figure 1** shows the distribution of patients by age group. All of the patients were male. Cultivators represented 85.36% (35/41) of the patients.

Table 1 gives the distribution of patients according to the favorable factors. Urological causes were the most frequent with 36.58% of cases.

Table 2 gives the distribution of patients according to etiologies.

The mean consultation time was 15.44 ± 16.04 days with extremes of 1 day and 60 days. The anatomical location of the lesions is given in **Table 3**.

The most frequent clinical signs were pain and infectious syndrome (100%), necrotic (47%) and ulcerative-necrotic lesions (53%). Ten patients (24.39%) experienced septic shock.

Therapeutically, all the patients benefited from resuscitation, bi or triantibio-

therapy and surgical debridement in the operating room. Antibiotic therapy included a third-generation cephalosporin, an imidazole, and an aminoglycoside if kidney function was good. Only 4 patients required two debridements in the operating room. A suprapubic cystostomy was performed in 4 (9.76%) patients. No colostomy was performed. Five patients benefited from secondary suturing distant from infectious phenomena.

Postoperative mortality was 24.39% (10/41). The average age of the deceased patients was 70 years. There was no statistically significant difference between the ages of the survivors and the ages of the deceased ($p = 0.180$). The average consultation time was 19 days in the deceased versus 14.37 days in the survivors but with no statistically significant difference ($p = 0.455$). We noted that the mortality rate was higher in patients who had a hemoglobin level lower than 10 g/dl compared to those who had a hemoglobin level higher than 10 g/dl ($p = 0.008$). The mean hospital stay was 10.83 ± 6.257 days with extremes of 1 day and 25 days.

Table 4 gives the comparison of clinical and biological elements between the series of mortality and survival.

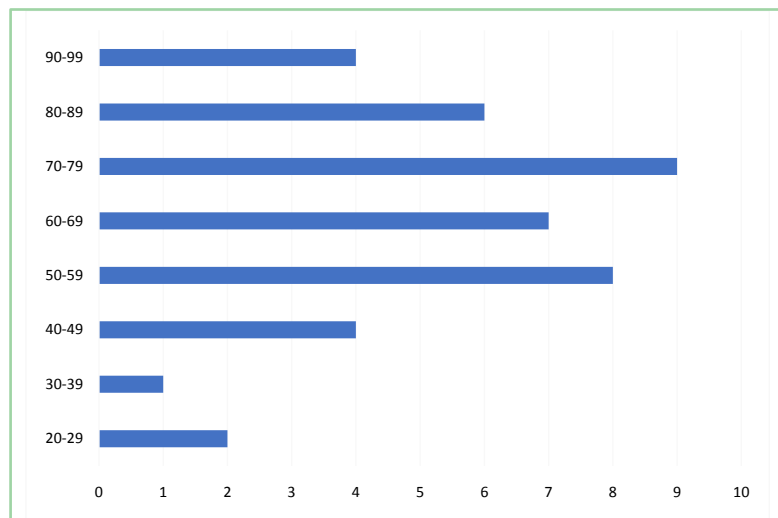


Figure 1. Age distribution of patients.

Table 1. Distribution of patients according to the risk factors.

Risk factors	Effective	Percentage (%)
HBP	9	22
Paraplegia	4	9.8
Diabetes	2	4.9
HIV	1	2.4
Sickle cell anemia	1	2.4
Renal failure	1	2.4
Idiopathic	23	56.1
Total	41	100

HBP: High Blood Pressure, HIV: Human Immuno-deficiency virus.

Table 2. Distribution of patients according to etiologies.

Etiologies	Effectif	Percentage
Urological (36.58%)	Scrotal abscess	3 4.88
	Infected hydrocele	4 9.75
	Urethral stenosis	4 7.32
	Benign prostatic hyperpasia	3 4.88
	Bladder tumor	1 2.44
Proctological (4.88%)	Perianal abscess	2 4.88
Iatrogenic (12.20%)	Post-prostatic adenomectomy	2 4.88
	Post-hydrocelectomy	3 7.32
Traumatic (2.44%)	Scrotal trauma	1 2.44
Dermatological (14.63%)	Bedsore	4 9.76
	Scrotal boil	2 4.88
No cause found (29.27%)		12 29.27
Total	41	100

Table 3. Distribution of patients according to the extent of the lesions.

location of lesions	Effective	Percentage (%)
Scrotum	25	61
Perineo-scotal	8	19.5
Penis	3	7.3
Scrotum and penis	4	9.8
pubis	1	2.4
Total	41	100

Table 4. Comparison of clinical and biological elements between survivors and deceased.

	Survivants N = 31	Décédés N = 10	Valeur p
Age	63.42 (±16.39)	70.00 (±22.24)	0.319
Consultation period	14.37 (±15.27)	19 (±18.93)	0.455
Septic shock	7.5%	17.5%	0.001
Duration of hospitalization	9.90 (±5.31)	13.70 (8.25)	0.096
Comorbidities present	48.39%	16.67%	0.467
Hemoglobin level			
<10 g/dl		50%	0.008
>10 g/dl		9.09%	
Creatinine	160.16 (±155.78)	214.98 (±128.91)	0.355

4. Discussion

In our series the GOG hospital frequency was 0.54%. In the United States Sorensen estimated its frequency to be less than 0.02% [5]. In the Kambou series in Burkina Faso, the GOG represented 2.3% of hospitalizations [6]. In other words, it is a rare condition. However, the most important series come from developing countries [1].

All of our patients were male. Indeed, GOG is known to be a condition which mainly affects the male subject. Most studies on the issue point to the

clear male dominance [7] [8] [9]. This is explained by the fact that in women there is better drainage of the perineal region through the vaginal secretions [1] [10] [11]. Yücell, on the other hand, reports in its series a female predominance at 56% [12].

GOGES was initially described by Jean Alfred Fournier as an affection of the young subject. But nowadays there is a change in the age of onset of this condition which reaches 61.7 years in certain series [13]. This would be linked to the increase in life expectancy. The average age of our patients was 65.65 ± 17.69 years with extremes of 23 and 95 years. Our study effectively confirms this evolution in the epidemiology of GOGES. Older age has been reported as a factor of poor prognosis in GOGES [14] [15]. In our series, however, we did not find a statistically significant difference between the age of the survivors and that of the deceased ($p = 0.180$).

In our series, high blood pressure was the most common comorbidity with 22% of cases. In addition, there were two cases of diabetes and one case of infection with the human immunodeficiency virus. What is decisive in these comorbidities is the decrease in cellular immunity which thus promotes infection [9]. However, there was no statistically significant difference between the survivors and the deceased concerning the presence or not of co-morbidity ($p = 0.467$). Four patients were paraplegic in our series. Spinal cord injured people are three times more likely to develop GOGES during their lifetime due to pressure ulcers and chronic urethral catheterization [10].

The three major etiological groups in GOGES are urogenital, proctological and dermatological [1] [9]. In our series gangrene without recognized cause represented 29.27% of cases. This high rate of gangrene without recognized cause could be explained by the lack of means of exploration in our context. Indeed, nowadays a cause is almost always identified in the GOGES [16]. Urological causes predominated in our series with 36.58% of cases. Fall in Senegal found a similar result [14]. We noted 5 cases (12.19%) of iatrogenic GOGES following a hydrocelectomy (3 cases) and a transvesical prostatic adenectomy (2 cases). Our result is higher than that of Ersay in Turkey who reported 2.9% postoperative gangrene in his series [17].

The mean consultation time for the deceased (19 days) was higher than that for the survivors (14.37 days), but the difference was not statistically significant ($p = 0.455$). Lujan Marco in Spain made the same observation [2]. However, some have established that rapid management is a good prognostic factor in GOGES [18]. Unfortunately, as Ruiz-Tovar pointed out, the period of consultation does not depend on the medical profession [19]. In our context, populations rarely consult health structures in the first place.

GOGES is a urological emergency whose treatment consists of a therapeutic tripod: resuscitation, triple antibiotic therapy and surgical debridement [20]. All our patients benefited from surgical debridement after resuscitation and bi or tri-antibiotic therapy. A first aggressive debridement often avoids a second intervention in the operating room [3].

GOGÉ's prognosis remains poor despite improved resuscitation facilities. Mortality varies between 16% and 40% and can go up to 80% in certain series [3] [8]. The mortality rate in our series was 24.39%. This means that about a quarter of our patients die. This result is clearly higher than that of Kambou, who noted a mortality rate of 5.5% [6]. This could be explained by the long consultation period in our series but also and above all by an inadequate resuscitation linked to the lack of biological explorations. There is still controversy as to the factors that influence mortality in GOGÉ [17]. Several prognostic factors have been reported. These include advanced age, diabetes, delay in treatment, and certain biological parameters [15] [19]. We were unable to establish prognostic scores in our series due to the unavailability of biochemical examinations in our health structure. This is a limiting factor in the correction of hydro-electrolytic disorders of our patients. However, we were able to demonstrate that the presence of septic shock as well as anemia was factors of poor prognosis in our series. Indeed, we noted that the mortality rate was higher in patients who had a hemoglobin level lower than 10 g/dl compared to those who had a hemoglobin level higher than 10 g/dl ($p = 0.008$). Ruiz-Tovar has shown that the risk of dying is 9.6 times higher if the hemoglobin level is less than 10 g/dl [19].

We did not find a statistically significant link between the survivors and the deceased with regard to serum creatinine ($p = 0.072$). Unlike our study, several studies have shown that elevated serum creatinine is associated with high mortality [4] [19].

5. Conclusion

GOGÉ still has very high lethality. Contrary to the initial description made by Jean Alfred Fournier, GOGÉ occurs today at an advanced age in patients with low immunity. Several factors determine its prognosis. But in our context, it is mainly the delayed diagnosis which seems to be the main factor. Thus, health education as well as an improvement of the technical platform with a resuscitation service will improve the prognosis of this condition.

Conflicts of Interest

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

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Penis Cancer: About Three (03) Observations at the University Hospital of Bouake

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Abstract

Objective: To report the diagnostic aspects and the therapeutic difficulties of this disease, to contribute to the prevention and screening of this cancer and propose a diagnostic, therapeutic and psychological management of penile cancer of patients at Bouaké University Hospital Center based on a short series of three (03) observations. **Patients and Method:** Over a period of five years (January 2012 to December 2017), we collected three (03) cases of cancer of the penis. **Results:** A total of three (03) cases of epidermoidal carcinoma of the penis were diagnosed. The average age of the patients is [52 years], all of them of low socio-economic level. Two (02) patients (n = 2) categorically refused surgical treatment (penile amputation) and one (01) patient was lost to follow-up. Two patients are currently deceased. **Conclusion:** Penile cancer has been an aggressive tumor with a pejorative prognosis, due to the delay of consultation in our underdeveloped countries. Patients consult late but above all refuse any idea of surgical treatment on the penis. The effort to be made is to insist on the prevention and screening of penile precancerous lesions by an adequate training of urban medical staff by a squad of specialists (urologists, oncologists and dermatologists).

Keywords

Penis, Cancer, Penile Amputation, Precancerous Lesions

1. Introduction

Cancer of the penis represents all the primary malignant tumors developed at the expense of the penis (foreskin - glans - cavernous corpus).

It is a rare tumor [1] [2], occurring around the 6th decade and its incidence is variable [3].

In the West, this tumor represents approximately 0.7% to 0.8% of adult male cancers, while in South-East Asia, Africa and Brazil its incidence reaches 17% [1] [4].

In Côte d'Ivoire its incidence is rare, constituting about 0.3% of cancers [5]. Infections, particularly HPV (HPV 16) and bad local hygiene are recognized as risk factors, while neonatal circumcision is thought to play a protective role [1] [2].

The most common histological type is epidermoidal carcinoma, which is multifaceted, ulcerative or budding, localized or invasive over the entire penis [1] [3].

Diagnosis is most often suggested by clinical examination.

The therapeutic modalities for penile cancer are multiple and complex and always adapted to the TNM stage (2009) [3], the tumor grade associated with psychotherapy [1] [2].

However, the prognosis remains pejorative because patients consult at an advanced stage and especially refuse any idea of penile amputation [1] [6].

In Côte d'Ivoire, particularly at the University Hospital Center of Bouaké, very little work has been done on penile cancer and its treatment, so we decided to carry out this work whose general objective was to contribute to the prevention of screening, diagnosis and treatment of penile cancer.

2. Patients and Methods

Over a period of five years (January 2012 to December 2017), we have collected three (03) cases of penile cancer at the urology department of the University Hospital Center of Bouaké, whose observations are summarized below.

2.1. Observations

2.1.1. Observation 1

This is a 70-year-old patient, circumcised in childhood, farmer, living in Fer-kessédougou, in northern Cote d'Ivoire, married, father of five (05) children, of low socio-economic level who consulted in January 2012, for a lesion of the penis evolving for eight (08) months, swollen and painful afterwards.

According to the patient, the lesion appeared in the form of an oozing wound, associated with local pruritus, neglected by the patient. The evolution was marked by a worsening of the symptomatology preventing sexual intercourse.

Clinical examination revealed an anxious patient with a preserved general condition.

An ulcerous-budding wound of the glans of the penis, about 5 cm in diameter, with a dirty bottom and irregular contours, bleeding on contact, an erect and painful penis, with induration of the cavernous corpus (**Figure 1**), the urethral meatus was obstructed. There were no inguinal adenopathies. The somatic examination of the other elements had no particularity. The patient underwent a cystotomy.



Figure 1. Ulcerous budding wound of the bleeding glans on contact with the erectile penis.

A biopsy and anatomico-pathological examination of the tumor were performed and revealed an advanced epidermoidal carcinoma of the penis (**Figure 2**).

The penile ultrasound performed objectified an infiltration of cavernous corpora. An antibiotic therapy was instituted and was made of 3rd generation cephalosporin + metronidazole associated with local antiseptic and analgesic treatments.

The patient was discharged against medical advice and was lost to follow-up.

He came back eight (08) months later in a general state alteration table. We concluded at a terminal stage of penis cancer. The patient benefited from a treatment based on analgesic, blood transfusion and an ulceration bandage. The patient died on August 10, 2012 in a sepsis condition.

2.1.2. Observation 2

Mr. N.C., a 44-year-old patient, building technician, residing in Bouaké, uncircumcised, married and father of two (2) children who consulted in February 2014 for penile ulceration and ulcerous-budding inguinal tumefaction evolving since approximately one year and 03 months.

The interrogation of the patient reports the notion of recurrent para phimosis, a sexually transmitted infection (STI) in adulthood.

The beginning of the symptomatology was about 1 year and a half ago with the appearance of an ulcerated swelling, located at the level of the glans, progressively increasing in size, becoming painful later on and interfering with sexual intercourse. Severe dysuria and initially non-fistulized inguinal adenopathies were also noted; all this evolved in a context of apyrexia and a progressive alteration of the general state.

Loco-regional examination revealed an ulcerous-budding wound invading the entire glans, hemorrhagic, deforming it and obstructing the navicular fossa (**Figure 3**).

In the right and left inguinal region, there was deep ulceration corresponding to fistulized inguinal lymphadenopathy, with irregular, dirty-bottomed margins. The cavernous corpora were indurated (**Figure 3**).

The patient was hospitalized; a cystostomy was performed.

Examination of the other elements had no particularity.

A bi antibiotic therapy consisting of 3rd generation cephalosporin + metronidazole was instituted with local antiseptic care.

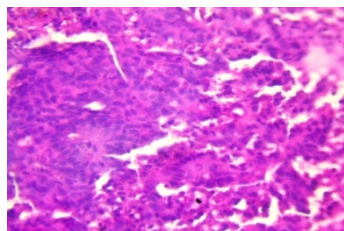


Figure 2. Slightly differentiated epidermoidal carcinoma of the penis: microscopic appearance.



Figure 3. Necrotic ulcerous wound of the glans and fistulized inguinal adenopathies after more than one year of evolution.

A biopsy of the tumor revealed an epidermoidal carcinoma of the penis (**Figure 4**).

The patient was discharged from hospital against medical advice and died three (03) months later in a severe sepsis.

2.1.3. Observation 3

Mr. K.K.D., 62 years old, farmer, residing in Béoumi, circumcised in childhood at the age of five (05) years old, who consulted in 2016 for a hemorrhagic lesion of the ventral face of the penis that had been evolving for approximately ten (10) months.

The beginning of the signs was marked by the progressive appearance of a small shiny tumefaction located on the ventral face of the penis, which will then ulcerate and increase in volume, making sexual intercourse painful. There was no association of dysuria.

The history was unremarkable.

On clinical examination, he was anxious and was in good general condition with colored conjunctiva. Local examination noted an ulcerous-budding lesion located at the base of the penis on its ventral side about 6 cm in diameter (**Figure 5**).

It was hemorrhagic on contact with irregular contours; the rest of the penis was flexible. There were no inguinal adenopathies.

Biopsy and anatomo-pathological examination of the lesion revealed an epidermoidal carcinoma of the penis that was slightly differentiated (**Figure 6**).

A prescribed extension assessment (ultrasound, MRI) could not be performed. Examination of the other elements was normal.

A total amputation of the penis as a treatment has been refused by the patient. The patient was lost sight of.

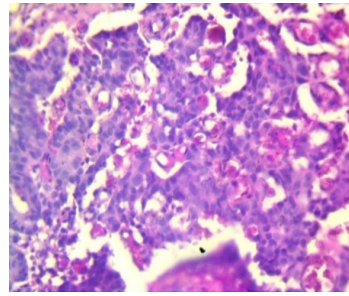


Figure 4. Epidermoidal carcinoma of the penis: microscopic appearance.



Figure 5. Ulcerous budding wound at the base of the penis bleeding on contact.

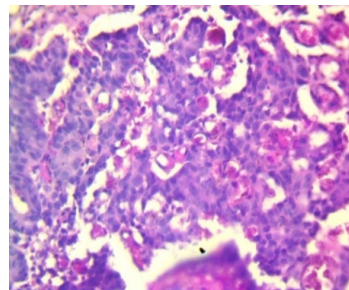


Figure 6. Epidermoidal carcinoma of the penis.

3. Comments

3.1. On the Epidemiological Level

3.1.1. Frequency

Epidemiologically, penile cancer is rare in Cote d'Ivoire [5] (0.3%); three (03) cases diagnosed in five (05) years at the University Hospital Center of Bouaké.

This rarity is mentioned by Magueye in Senegal with 0.35% and Nouri in Morocco with six (06) cases in ten (10) years [7] [8].

This could be explained by the practice of ritual circumcision of our populations in the north in particular and in Côte d'Ivoire in general.

The incidence of this condition varies according to geographic location.

It represents 0.7% - 0.8% of cancers in Europe, 17% in South-East Asia and Brazil and is estimated at 0.1% in Israel [1] [2] [3].

This observation can be explained by the low socio-economic situation of our patients and by the inadequacy of our hospital data.

3.1.2. Age

The mean age at diagnosis in our study is 56 years and is consistent with the literature.

Magueye has an average age of 50 years and Nouri in Morocco 65 years.

If we gather the different series of Nouri, Magueye and our own, we observe that the majority of patients are over 50 years old [6] [9] [10].

This distribution is 70% of cases after 50 years [1] [6] [9] [10].

3.1.3. Factor of Risks

Tumor may occur as a result of chronic inflammation of the glans or a lack of local hygiene [9] [11]. In our study, the search for precancerous lesions was unsuccessful due to the late consultation [9] [11].

3.1.4. Anatomic-Pathology

The most frequent histological form is epidermoidal carcinoma in 95% of cases [1] [2] [6] [7] [12].

All our patients had squamous cell carcinoma of the penis. These findings comply with the literature review [1] [2] [3] [6] [7].

Regarding the localization, the lesion was located on the glans in three patients and on the ventral side, at the base of the penis in one patient [6].

3.2. Diagnostic

3.2.1. Clinic

It is an ulcerous budding tumor whose circumstances of discovery are represented by a painless lesion with a type of burn, pruritus, bleeding on contact with an increase in the volume of the glans [1] [2] [6] [7] [12].

Sometimes phimosis or clinical signs (acute urine retention, dysuria) may appear, which are rare.

The diagnosis is primarily clinical based on palpation of the penis, tumor and areas of ganglion in search of inguinal adenopathies.

In our series, the diagnosis of cancer was confirmed by examination of the penis and ganglion areas, which revealed the tumor located at the glans in two (02) patients and at the base of the penis in one (01) patient.

The size ranged from 5 cm to 6 cm in diameter in all patients.

The location of the lesions was at the level of the glans and the balano-preputial groove in three (03) patients. In the literature review, the tumor preferentially affected the glans [1] [2] [3] [4] [6].

The cavernous corpora were invaded in two (02) of our patients out of two (02) (50%) and one (01) patient had a lesion infiltrating the urethra.

Nourri and Al noted tumor lesions of the penis all localized at the level of the glans and the preputial balano groove with two patients, with tumors infiltrating the urethra [8].

In our series, two patients had presented a tumor infiltrating both the cavernous corpus and the urethra causing urine retention. Palpation of the inguin-

al regions revealed fistulized inguinal adenopathies in one patient. These inguinal ganglions are most often present in advanced tumors of the penis [1] [2] [6].

In Teck-Weik and Nourri, half of the patients presented a ganglionate location [8] [10] [11].

3.2.2. Paraclinical

Tumor biopsy is necessary in case of doubtful diagnosis and will reveal the histological type of the penile tumor [1].

In our series, the different biopsies performed on the tumors and the anatomic-pathological examination reported 100% of epidermoidal carcinomas, in agreement with the results in the literature. Indeed, epidermoidal carcinoma appears by far as the most frequent histological type [1] [2] [3] [4] on the radiologic level, the ultrasound and penile MRI can help in the diagnosis but above all can confirm cavernous and ganglionate extension [1].

Our patients were not able to benefit from additional examinations because of their low socio-economic conditions but also due to the insufficiency of the technical facilities.

The discovery of the PET scanner is a scientific revolution in the diagnosis of penile tumors [1] [6].

In our series, local extension was sought by clinical examination of the penis (palpation of the penis) sometimes supplemented by penile ultrasound.

None of the patients was able to perform the penile MRI, which is the best test for extension assessment [1].

3.3. Therapeutic

The management of penile tumors is complex in our regions.

Surgical treatment is based on partial or total amputation of the penis, which may be associated with a removal of ganglion [1] [6].

Surgery should be conservative at most as long as the lesion allows [1] [6] [10].

Penile amputation is the removal of the tumor with a safety margin but leaving if possible a sufficient part of the penis (>3 cm) to preserve the function of the penis. The major complication is mesal stenosis (7% - 10%) [1] [2]. 3 out of 4 patients refused penile amputation in our study.

A perineal urethrostomy should be performed if the penis is completely amputated.

In our series two patients were lost to follow-up after refusing surgical treatment; one patient died with severe sepsis.

Refusal of penile amputation is very common among our patients in sub-Saharan Africa.

In our short series of three patients, two refused amputation of the penis due to ethical and customary issues. Other therapeutic modalities exist such as radiotherapy and laser therapy [1] [6].

3.4. Psychological, Evolutionary and Prognostic Plan

The psychological profile of our patients was marked by anxiety and distress, as Magueye notes [7] occurring because of the location of this tumor on the intimate parts [7].

The evolution was marked by the probable extension of the tumor and death. Three patients died and one patient was lost to follow-up comparable to the high death rate if diagnosed late as Magueye mentioned it [1].

The prognosis was fraught with complications and was pejorative. [1] [6] [7].

4. Conclusions

In our work, malignant tumors of the penis were exceptional, rare and their treatments are complex in Cote d'Ivoire.

This tumor occurs at an average age of about 55 years. Favoring factors are neglected by our patients and diagnosis is most often late at an advanced stage in our African countries.

Epidermoidal carcinoma is the most common and surgical treatment based on partial or total amputation of the penis, is most often refused by patients, which puts a heavy burden on the prognosis of this rare and complex cancer.

A multidisciplinary team of urologists, cancer specialists and dermatologists should be formed to assist the formation of medical staff, screening, prevention and treatment of precancerous lesions of the penis.

Conflicts of Interest

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

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Growth Hormone Releasing Hormone Receptors Antagonists and Cancers: Do GHRH-R Antagonists Play a Role in the Management of Prostate Cancer?

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Abstract

Growth hormone-releasing hormone (GHRH) and its receptors have been implicated in the progression of various tumors such as those of the prostate. Treatment modalities for prostate cancer in a localized stage or when it is still castration-sensitive yield good results in most patients. However, such treatments are only palliative in the advanced stage. Therefore, new therapeutic targets like growth hormone-releasing hormone receptor (GHRH-R) and its splice variants should be found in order to get effective treatments for more aggressive stages in prostate cancer. This review talks about the GHRH-R and its splice variants, the signaling pathways induced by GHRH to produce cancer, the structure activity relationship of GHRH-R antagonists and the resume of some *in vitro* and *in vivo* studies on the role of GHRH-R antagonists in the treatment of prostate cancer.

Keywords

GHRH, Receptors, Antagonists, Prostate, Cancer

1. Introduction

In spite of the impressive progress in diagnosis, surgery, and chemotherapy, prostate cancer is still the second most common cancer and the fourth leading cause of cancer death among men in China [1]. Considering the disadvantages of standard treatments for prostate cancer in their late stage, it's crucial to ex-

plore new therapeutic strategies for advanced prostate cancer with less or no side-effects and to substitute the palliative treatment. In addition to its endocrine role, the GHRH has been shown to act as a growth factor driving the progress of cancer in diverse malignancies including prostate cancer [2]. Therefore, the molecular changes in prostate carcinogenesis induced by GHRH make GHRH-R and its splice variants (**Figure 1**) therapeutic targets for patients with advanced prostate cancer.

2. GHRH-R and Its Splices Variants in Human Prostate Cancers

Besides the pituitary type of GHRH-R, some studies have described GHRH-R splice variants (SVs) in human prostate cancers [3] [4]. From these studies we noted that SV1 is present in 65% of the human prostate cancers. A major part of the nucleotide sequence of SV1 has more than 99% identity with the corresponding sequence of pituitary GHRH-R cDNA [5]. SV2 is shown in 60% of prostate cancer specimens. SV2 most likely encodes a GHRH receptor isoform truncated after the second transmembrane domain [5]. The deduced protein sequences of SV1 and SV2 suggest that they possess a distinct 25-amino acid sequence at the N-terminal extracellular domain, which could serve as a signal peptide. The expression of SV4 is about 15%. The short protein sequence corresponding to SV4 lacks all transmembrane domains, implying that it is not expressed on the cell surface. After PCR amplification, it has been detected a novel SV of GHRH receptor in prostate cancer in which exons 5 and 6 are missing, whereas exon 7 is retained [5].

GHRH receptor isoform encoded by SV1 could mediate the effect of GHRH and its antagonists on extrapituitary cells and various tumors [4]. These SVs forms have demonstrated both ligand-dependent and independent activities [2] [6].

3. Physiological Action of GHRH as a Protumoral Agent

Pituitary type GHRH receptor (pGHRH-R), is a class II G-protein-coupled receptor with seven transmembrane domains and is homologous with the receptors for vasoactive intestinal peptide (VIP), pituitary adenylate cyclase activating peptide (PACAP) and calcitonin [7]. Activation of the G-protein complex stimulates adenylyl cyclase, which results in the conversion of ATP to cAMP. cAMP, functioning as second messenger in the GHRH signal transduction, induces phosphorylation of intracellular and membrane-associated proteins and leads to IGF-I secretion (a known mitogen) from the liver [8]. At the level of the mechanism of GHRH action, it is important to identify the specific receptors in which the local effects of GHRH are mediated and to define the network of the proliferative and non-proliferative consequences of GHRH action. The elucidation of the downstream targets that follow receptor binding and activation will shed light on how GHRH exerts its mitogenic effects. The stage of tumorigenesis with which GHRH production is associated, being briefly the initiation, promotion and maintenance of cancer, also remain an open question.

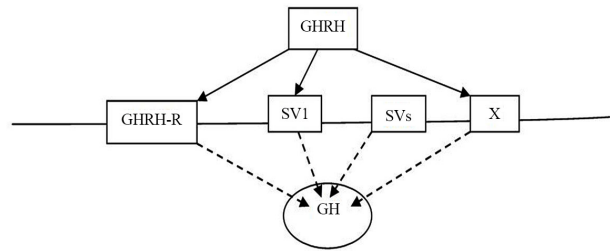


Figure 1. Representation of the action of GHRH. The effects of GHRH are mediated by GHRH-R, SV1, and probably others receptors (X), which may include the receptors of VIP and PACAP.

4. Pathological Action of GHRH: Signaling Pathways Involved in Tumoral Process

As a ligand-bound G-protein coupled receptors, GHRH can activate cytoplasmic heterotrimeric G-proteins whose α subunit responds by exchanging its GDP for GTP. The $G\alpha$ subunit activates its own effectors, including the *Ras-Raf-MEK-ERK* pathway also called *MAPKs* pathway, the *Ras-PBK-Akt* pathway, the *Jak/STATs* pathway. All these pathways are linked to cell differentiation, proliferation, metabolic changes and cell migration [9]. It is known that G-protein coupled receptors are able to activate tyrosine kinase receptors [10]. So GHRH is also involved in the transactivation of the signaling of epidermal growth factor receptor (EGFR/HER1/ErbB1) and human epidermal growth factor receptor-2 (HER2) in prostate cancer [11].

In the figure (Figure 2), GHRH can bind directly to GHRH-Rs on multiple cell types of endocrine and nonendocrine origin. Signaling pathways that are activated by GHRH and its agonists include AC/cAMP/PKA, Ras/Raf/ERK, PI3K/Akt, and STAT3. Mediation through these signaling pathways leads to enhanced cell survival, proliferation, and secretion of cytokines. GHRH antagonists inhibit these pathways by competitively binding to the GHRH-R.

5. GHRH-R Antagonists

GHRH-R has been considered as a potential therapeutic target for cancer in recent years. Several GHRH-R antagonists have been used experimentally against cancers; the theory of using GHRH-R antagonists is suggested to be discussed. We can enumerate some GHRH-R antagonists: earlier GHRH-R antagonists (MZ-4-71 and MZ-5-156), JV-1-series (38, 63, 65, 68, 80), MZ-J-7-series (114, 118, 138 and 132) and the MIAMI-series (602, 604, 606, 610, 640 and 690). JV-1-63 is one of the more potent endocrine antagonist of GHRH reported to date against human prostatic growth [12]. The theory of using GHRH-R antagonists is suggested to be discussed.

5.1. Structure Activity Relationship of GHRH-R Antagonists

Early studies revealed that replacement of Ala^2 in GHRH by $D-Ala^2$ or N -methyl- $D-Ala^2$ led to superpotent agonist while the replacement by $D-Arg^2$

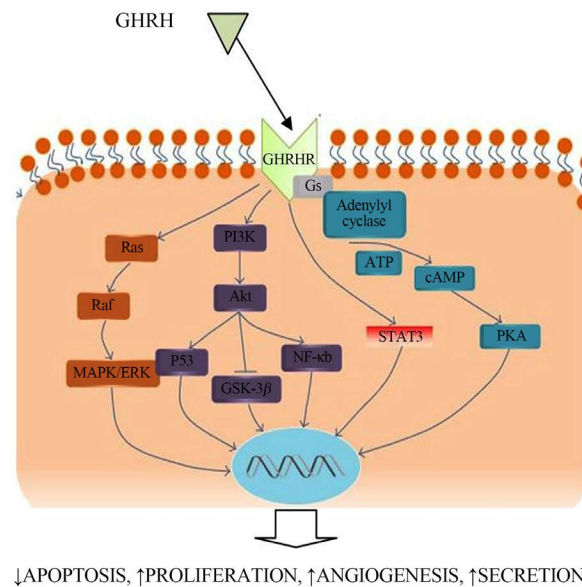


Figure 2. Schematic illustration of pathological activity of GHRH.

produce antagonists [13]. Chemical modifications tend to increase the selectivity of new series of GHRH-R antagonists because they exhibit increased antitumor effects *in vivo* on human experimental prostatic cancer but weaker endocrine effects on the inhibition of hepatic IGF-1 in serum as compared to earlier antagonists such as MZ-4-71 or MZ-5-156 [14] [15] [16] [17].

More than 20% of pharmaceuticals now contain one or more fluorine atoms [18]. The novel analogs designated “MIA” have been designed by incorporating *pentafluoro-Phe* at different positions into the previous MZ-J-7-series and the JMR-132 antagonist. This resulted to an increased anti-cancer activity compared to earlier JV-series. It has been recognized that the presence of fluorine in compounds results in metabolic stability [19] leading to improved bioactivity and bioavailability [20].

5.2. GHRH-R Antagonists Effects in Prostate Cancer

The anti-tumor effects of GHRH antagonists can be mediated through direct mechanisms. One of these mechanisms is based upon the inhibition of the secretion of autocrine/paracrine IGF-I or IGF-II from the tumors; the most important pathway involves the blockade of action of autocrine GHRH in tumors. The anti-tumor activity of GHRH antagonists is especially important oncologically because of the wide expression of the intrinsic GHRH and SVs of GHRH-R in various cancers. We can share some results of recent studies:

1) In a study carried by Nektarios Barabutis and Andrew Schally (2008) on the inhibition of human cancer cell line by knocking down gene expression for GHRH, they found that of In this study, the proliferation rate of prostate cancer cell lines (LNCap) were decreased by 26% - 37% and 31 - 42% after exposure to GHRH-R antagonists MZ-4-71, MZ-5-156 and JMR-132 at concentration of 0.1 and 1 μ M respectively [21];

2) In a study carried on nude mice with objective the inhibition of the orthotopic and metastatic growth of PC-3 human androgen-independent prostate cancers by GHRH-R antagonists (MZ-4-71 and MZ-5-156), bombesin and gastrin releasing peptide; Anton Stangelberger *et al.* (2005) found that the growth of subcutaneous xenografts of human androgen independent PC-3 prostate cancers was inhibited by high dose (20 µg b.i.d.) of MZ-4-71 and MZ-5-156 or much lower dose (2.5 - 5 µg/day) of new and more potent antagonists MZ-J-7-118 and MZ-J-7-138 [14] [17]. GHRH-R antagonists also inhibited the orthotopic growth of PC3 tumors [17];

3) Andrew Schally *et al.* in these studies found that, given alone, GHRH antagonists JV-1-38 (20 µg/day) or MZ-J-7-118 (5 µg/day) were ineffective for the treatment of prostate cancers LNCaP and MDA-PCa-2b, but they greatly enhanced the inhibitory effects of androgen deprivation therapies such as surgical castration and LHRH agonists or antagonists on the growth of subcutaneous and orthotopic prostate tumor [22] [23] [24];

4) Kanashiro *et al.* in three studies demonstrated that GHRH-R antagonists inhibit the *PKC-MAPKs* and *PBK-Akt* signaling pathways, decrease the expression of *cjun* and *c-fos* oncogenes, and mutant *p53* protein levels in human prostate cancer models [25] [26] [27]. In addition GHRH-R antagonists decrease anti apoptotic *Bcl-2* and increase pro apoptotic *Bax* protein in the prostate cancer line LNCaP. They trigger a Ca^{2+} dependent apoptotic mechanism;

5) Laura Muñoz-Moreno *et al.* (2016) found in this study that, GHRH-R antagonists JMR-132 and JV-1-38 suppressed cell proliferation and decreased the levels of the proliferation marker, PCNA, in the three cell lines (non-tumoral RWPE-1 and tumoral LNCaP and PC3 human prostatic epithelial cells) and in PC3 tumor. They led to an increase of cells in S-phase and a decrease in G1 and G2/M phases, and induced S-phase arrest and significant increase ($p < 0.001$ vs. control) of apoptotic cells like p53, p21 and bax [28];

6) In a study carried by Nektarios Barabutis and Andrew Schally (2008) on the antioxidant activity of growth hormone-releasing hormone antagonists in LNCaP human prostate cancer line, they found that GHRH antagonist, JMR-132, inhibited the expression of the major antioxidant enzymes (GPx1, SOD1, NQO1, and Trx1), as well as the expression of COX 2 and cytochrome c oxidase IV, which are enzymes involved in the generation of ROS. It also suppressed lipid and protein oxidative stress markers, as well as the intracellular generation of ROS. They also noted that the activation of the NF-κB p50, which promotes carcinogenesis, is enhanced by oxidative stress and cells exposed to JMR-132 expressed lower levels of pNF-κB [29];

7) This study carried by Laura Muñoz-Moreno *et al.* (2018) was performed in three human prostate cell lines (RWPE-1, LNCaP and PC3). In this study, GHRH-R antagonists (MIA-602, MIA-606, and MIA-690) decreased cell viability and provoked a reduction in proliferation in LNCaP and PC3 cells. They reduced β-catenin levels in the nucleus preventing the activation of transcription

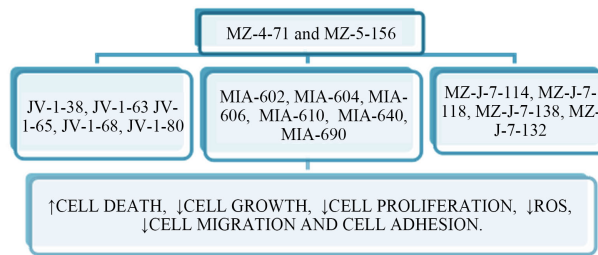


Figure 3. Pictorial representation of GHRH-R antagonist's activities.

of target genes, *c-myc*, *cyclin D1*, and *CD44* with the highest value with MIA-690 in PC3 cells. VEGF (vascular endothelial growth factor) which is related to molecules involved in migration and adhesion as β -catenin or MMPs 9 and 2 (matrix metalloproteinase) protein levels were decreased by 31% after treatment with MIA-602, MIA-606, and MIA-690 as compared to control (β -actin antibody) [30].

Figure 3 summarizes the effects of GHRH receptor antagonists. The synthesis of the new series of GHRH receptor antagonists comes from chemical modifications of the first two molecules (MZ-4-71 and MZ-5-156). The new series thus present a more pronounced anticancer activity.

6. Conclusion

According to current existing literature, GHRH-R antagonists could be defined as inhibitors of tumor progression in prostate cancer and should be considered for use in future therapeutic strategies. Our review supports the merit of development of GHRH-R antagonists for the clinical therapy of prostate cancer. We think that other signal transduction mechanisms arise from those mediated by cAMP may also mediate the effect of GHRH, so combination therapies that target all the pathways involved in the pathogenesis of prostate cancer should increase the efficacy of future. An example could be the use of GHRH-R antagonists in association with a monoclonal antibody that target the EGFR.

Authors' Contributions

All the authors read and approved the final version of the manuscript.

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Availability of Data and Materials

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Ethics Approval and Consent to Participate

Not applicable.

Consent for Publication

Not applicable.

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Conflicts of Interest

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

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Abbreviations

GHRH-R: Growth hormone releasing hormone receptors;

cAMP: cyclic Adenosine monophosphate;

VIP: Vasoactive intestinal peptide;

PACAP: Pituitary adenylate cyclase activating peptide;

IGF-1: Insulin-like growth factor 1;

CDKN2: Cyclin dependent kinase inhibitor 2;

ERK: Extracellular signal-regulated kinase;

MAPKs: Mitogen-activated protein kinases;

Jak: Janus activated kinase;

STATs: Signal transducers and activators of transcription;

EGFR: Epidermal growth factor receptor;

HER: Human epidermal growth factor receptor;

PCR: Polymerase chain reaction;

ROS: Oxygen reactive species

Catgut Implantation at Baliao and Xingfu One Acupuncture Point to Treat Dysdefecation in Patients with Incomplete Spinal Cord Injury: Three Cases Report

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Abstract

Objective: To probe into the effect of catgut implantation at Baliao and Xingfu One Acupuncture Point on dysdefecation in patients with incomplete spinal cord injury (SCI). **Methods:** Three SCI patients voluntarily accepted catgut embedding at Baliao and Xingfu One Acupuncture point. Before and after treatment, they were filled out the self-rating scale of defecation, including the data of defecation frequency, total defecation time, defecation effort, fecal texture, fecal characteristics and fecal incontinence, etc. **Results:** Compared with the baseline data, constipation was improved and fecal incontinence was disappeared. **Conclusions:** Catgut implantation at Baliao and Xingfu One Acupuncture Point is effectual for patients with neurogenic dysporia secondary to incomplete SCI.

Keywords

Baliao, Xingfu One Acupuncture Point, Catgut Implantation, Spinal Cord Injury, Dysdefecation

1. Case Report

Sacral neuromodulation is a low-frequency electric pulse regulation technique of

sacral nerve using interventional technique. SNM is not only used for refractory Overactive Bladder, idiopathic urinary retention [1] [2], fecal incontinence [3], but also has some effects on neurogenic bladder [4], chronic constipation [5]. However, it has the disadvantage, such as high price, complicated operation, radioactive and postoperative infection and so on. It is the common task of Urology, neurology, rehabilitation medicine and multi-professional team to find a more simple, effective and cheap treatment. How to make SNM further convenient and more acceptable to patients? Apart from SNM, is the pudendal nerve touch feasible? What is the relationship between them? In our previous clinical studies, it has been confirmed the effectiveness of Catgut Implantation at Baliao and Xingfu One Acupuncture Point for urinary incontinence in patients with incomplete SCI [6]. Then whether this treatment is effective for defecation disorders in patients with incomplete SCI? Presently reports are as follows.

2018-2019, three cases with dysdefecation secondary to incomplete spinal cord injury (SCI) were collected (**Table 1**). They were assessed the clinical efficacy score of defecation (self-assessment) before and after treatment (**Table 2**).

All patients signed informed consent before per treatment. They accepted catgut embedding at bilateral Baliao, Xingfu One Acupuncture points for three times (an interval of 14 days). Four pairs of posterior sacral foramen are called Baliao (green marker); Xingfu One Acupuncture point is the same level as the fourth posterior sacral foramen and it is close to the lateral edge of the sacrum (red one) (**Figure 1**).

Figure 2 showed disposable acupoint catgut embedding assistant package and syringe needle (**Figure 2**).

All patients were not allowed to bathe within 24 hours after therapy. No spicy and irritating foods were permitted to eat within 3 days after catgut embedding. Before and after the remedy, they recorded the data of defecation frequency, total defecation time, defecation effort, fecal texture, characteristics and incontinence, etc. Compared to the baseline data, constipation was improved and fecal incontinence was disappeared (**Tables 3-5**), (**Figure 3**).

No related adverse events were found. The informed consent was obtained from all subjects to report the cases.

2. Discussion

From **Table 3**, we can see that, except fecal characteristics, three patients' sub-scores of clinical effect after treatment were lower than that before treatment. **Table 4** and **Figure 3** indicate that each patient' total score of clinical effect after therapy is also lower than that before therapy. In **Table 3**, the most significant change is fecal incontinence: This is closely related to the first patient. Before catgut embedding, the frequency of fecal incontinence of this patient is less than or equal to 1 time/week, and after catgut embedding, fecal incontinence disappears. See **Table 5** for details. The score of fecal characteristics slightly increased, indicated that in general, the stool of patients after treatment tends to be softer.



Figure 1. Anatomical sketch of Baliao and Xingfu One Acupuncture point.



Figure 2. Appliances of catgut embedding.

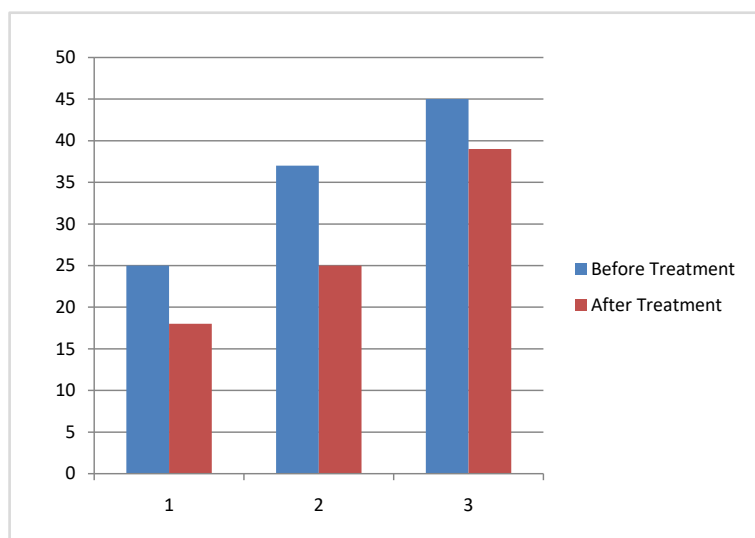


Figure 3. Changes in total score of clinical effect on defecation in 3 patients before and after treatment.

Table 1. Baseline characteristics of the cases.

Number	Gender	Age (y)	Duration of SCI (y)	Disease	Constipation	Fecal Incontinence
1	F	37	2	SCI (C4 AIS Grade D)	Yes	Yes
2	F	19	2	Cauda Equina Syndrome	Yes	No
3	M	36	1	SCI (T10 AIS Grade C)	Yes	No

Table 2. Clinical efficacy score of defecation.

	0	3	5	7	score
Defecation Frequency (times/day)	1 day once	2 - 3 days once	4 - 5 days once	>5 days once	
Total Defecation Time (min)	<15 mins	15 - 30 mins	30 - 60 mins	>60 mins	
Defecation Effort	easy	slightly difficult	more difficult	hard	
Fecal texture	soft	slightly hard	hard	Very hard	
Fecal Characteristics	Dispersing hard blocks, Similar to hard block or granular	Dry hard block, Surface Crack, Smooth and Soft, Like Sausage (Banana)	Clear-Cut Margin, Soft Cluster	marginal indistinctness, Paste Like	
rectum mucosa protector (Glycerin)	No	0.5 - 1 drug a day	2 - 3 drugs a day	>4 drugs a day	
Manual Dilatation	No	<5 turns	5 - 10 turns	>10 turns	
Hand digging	No	≤once/week	2 - 3 times/week	>3 times/week	
Fecal incontinence	No	≤once/week	2 - 3 times/week	>3 times/week	
Total Score					

Table 3. Changes in sub-scores of clinical effect in 3 patients before and after therapy.

Item	Arithmetic mean ± Standard deviation	
	Before therapy	After therapy
Defecation Frequency (times/day)	2.00 ± 1.73	1.00 ± 1.73
Total Defecation Time (min)	4.33 ± 1.15	3.67 ± 1.15
Defecation Effort	5.67 ± 1.15	4.33 ± 2.31
Fecal texture	5.00 ± 0.00	3.67 ± 1.15
Fecal Characteristics	3.33 ± 2.89	3.67 ± 1.15
rectum mucosa protector (Glycerin)	3.67 ± 1.15	3.00 ± 0.00
Manual Dilatation	3.33 ± 2.89	2.00 ± 1.73
Hand digging	5.67 ± 2.31	4.67 ± 4.04
fecal incontinence	1.00 ± 1.73	0.00 ± 0.00

Table 4. Changes in total score of clinical effect in 3 patients before and after treatment.

Number	Before treatment	After treatment
1	25	18
2	37	25
3	45	39
Arithmetic mean ± Standard deviation	35.67 ± 10.07	27.33 ± 10.69

Table 5. Changes in fecal incontinence of 3 cases before and after therapy.

Number	Before therapy	After therapy
1	3	0
2	0	0
3	0	0

Baliao (BL 31-34), lies in four pairs of posterior sacral foramen, it is equal to the Sacral Jiaji Point. The reinforcing stimulation of the above target region on the sacral nerve can promote function recovery of the intestinal nervous system and the autonomic nervous one. Through the action relationship of Brain-gut Axis, Regulate the somatic-visceral reflex, the afferent of sensory signals, the activity of internal and external anal sphincter. Patients can reduce the colonic transit time, enhance the contractility of the intestine, increase the secretion of the intestinal fluid, boost the coordination of pelvic floor muscles, etc., so as to improve the defecation [7] [8] [9]. Because of its unique characteristics in the remedy of urogenital diseases, pelvic floor anorectal ones and so forth, it had been highly praised by doctors through the ages, especially for its obvious effect of Zhongliao (BL 33), Ciliao (BL 32). Historically, There is a widespread clinical application [10] [11] [12].

Xingfu One Acupuncture Point is about 6 cm deep from the surface of the body, it is even with the Fourth sacral posterior foramen and it is three transverse fingers (ring, middle and index finger) away from the sacral median ridge. This is extra nerve point. It has a good curative effect by touching pudendal nerve in treating anorectal or urinary [6] or sexual dysfunction, gynecology and other diseases.

Acupoint catgut embedding achieves therapeutic aim by stimulating acupuncture points for a long time. This therapy is safe, simple, cheap and well-compliant. It is worthy of clinical research, application and promotion. This case report shows that, after catgut implantation, the patients' constipation and fecal incontinence were significantly improved. The two groups of acupoints act on mutual promotion and synergistic effect. It is a simple and easy Chinese-style therapy of "sacral nerve regulation" and "pudendal nerve touch".

3. Conclusion

Catgut Implantation at Baliao and Xingfu One Acupuncture Point is effective for dysdefecation secondary to incomplete SCI.

Acknowledgements

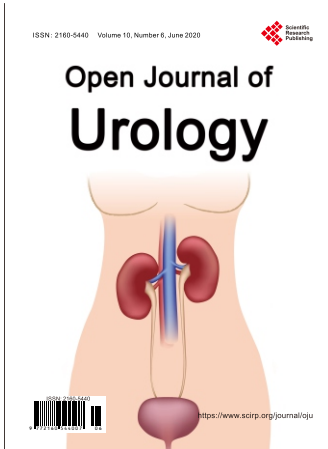
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Conflicts of Interest

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

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