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IMPEDIMENTS TO SALVAGE OF THE TESTIS AFTER TORSION IN A NIGERIAN TERTIARY HOSPITAL
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IMPEDIMENTS TO SALVAGE OF THE TESTIS AFTER TORSION IN A NIGERIAN TERTIARY HOSPITAL

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ABSTRACT

Background: **Testicular torsion is fraught with the risk of losing the testis if prompt surgical intervention is not instituted. The salvage rates for testis after torsion have been found to vary across the globe.**

Objective: To determine factors affecting the salvage rate of testis following testicular torsion at the University of Port Harcourt Teaching Hospital (UPTH).

Design: **A prospective descriptive study**

Setting: **University of Port Harcourt Teaching Hospital**

Subjects: **Sixty eight patients who presented with testicular torsion in our hospital from between 2012 and 2015.**

Intervention: Detorsion and orchidopexy for viable testis. Orchidectomy for gangrenous testis.

Main outcome measures: **Size of testis after orchidopexy.**

Results: **Sixty-eight patients were treated within the period. The mean age of the patients was 24.6 ± 5.5years. Most patients (n=44; 64.7%) presented between the ages of 21 to 30years. The most common presenting complaint was testicular pain (n=64; 94.12%). Only six patients (8.82%) presented within 6 hours. Eighteen patients (26.47%) first presented to patent medical attendants. Thirty-three patients (48.53%) presented with acute testicular torsion. Thirty-two patients (47.06%) had orchidectomy while 36(52.94%) had orchidopexy. Thirty-two (47.06%) had immediate testicular loss, while twenty-four (35.29%) had satisfactory outcome. Factors associated with testicular loss were presentation after 24hours (p=0.001), and initial treatment by a patent medical attendant and general medical practitioners.**

Conclusion: **Low salvage rate after testicular torsion due to delayed presentation to appropriate health facility was noted in Port Harcourt. Health education and increased awareness even amongst doctors would help improve the salvage rate.**

INTRODUCTION

A twist or rotation of a part of organ on its long axis or on its mesentery is known is torsion. Torsion of the testes occurs when the spermatic cord rotates along its long axis leading to reduced blood supply to the testes1. It is a true urological emergency that needs urgent management to prevent testicular loss and risk of subfertility2. The basic pathophysiology behind testicular torsion is a malformation in which the testicle is allowed to rotate more freely around the spermatic cord3. Testicular torsion was first diagnosed by a French surgeon Delasiauve in 18404. Most common presentation is acute severe scrotal and abdominal pain5. Urinary tract symptoms like frequency and dysuria are unusual. Some patients may have acute testicular torsion. Others may have milder episodes of intermittent testicular pain with

spontaneous relief; this is known as intermittent testicular torsion1, 6. The most common physical findings are generalized testicular tenderness and absent cremasteric reflex1. Other findings include tenderness on elevation of the testes, abnormal lie, thickening of the cord and scrotal swelling1. Loss of cremasteric reflex has been controversial in diagnosis of testicular torsion1.When in doubt, investigations may be carried out as long as they would not delay surgical exploration unduly. Doppler ultrasonography has a sensitivity of 88 percent and specificity of 90 percent in detecting testicular torsion7. Ultrasound scan is relatively cheap and readily available. Scintigraphy can also be used when there is a diagnostic dilemma, technetium 99m pertechnetate is almost a 100% sensitive8. However, it is less readily available especially in resource poor setting. The effect of radiation on the rapidly dividing germinal epithelium is also a drawback to its use. The time from onset of symptoms to intervention is the most crucial factor in salvaging the testes5,9. The Leydig cells are believed to be more resistant than the cells of the germinal epithelium to the ischaemic effects of torsion9. Torsed testis can be salvaged by orchidopexy. Elective orchidopexy may also be offered to patients with intermittent torsion because of increased risk of testicular loss6. Prompt recognition and treatment are necessary for testicular salvage. Salvage rates of the testes vary across the globe. The salvage rate in Lagos, Nigeria was 32% due to delayed presentation10. The salvage rate in Korea was 75.7%11; salvage rates in Norway was 55.3%12 and 69.2% in Turkey13. The large number of testes lost after torsion in our institution prompted us to prospectively evaluate the factors responsible for the low salvage rate in Port Harcourt, Nigeria. It is hoped that the findings will enable us recommend measures that will improve the salvage of testis in our sub-region.

MATERIALS AND METHODS

This was a prospective study. Approval was obtained from the Hospital Ethics Committee Research ethics committee for the study. All patients with acute scrotum from 2012 to 2015 were evaluated. Those with diagnosis of testicular torsion were included in the study. Diagnosis of testicular torsion was made from a combination of history and physical examinations. Their ages, symptoms, signs, duration of symptoms, who they first presented to, treatment received were noted. Patients who had other scrotal condition were excluded from the study. When in doubt a Doppler ultrasound scan was performed to confirm diagnosis. No patient had scintigraphy. Patients with torsion had immediate scrotal exploration under local anaesthesia using plain lignocaine. Those with gangrenous testes had orchidectomy, those with ischaemia whose blood flow improved after detorsion had orchidopexy at the superior and inferior poles using nylon 4/ 0. The contra-lateral testes were also similarly fixed. Wounds were closed in layers. Dressing and scrotal support to prevent haematoma were applied. Patients were discharged after three days. Patients were followed up every month for six months. At each visit the testes were examined for possible atrophy. Data were collated and analysed using Epinfo version 7, 2015, CDC, Georgia, USA.

RESULTS

There were 68 patients treated for torsion within the study period. The mean age of presentation was 24.6 ± 5.5years. Most patients (n=44; 64.7%) presented between the ages of 21 to 30years. The age distribution is shown in table 1.

Table 1

Age group of patients.

Age Group	Frequency (n=68)	Percentage (%)
10-20	15	22.05
21-30	44	64.7
31-40	9	13.24
Mean Age (Mean ± SD)	24.6± 5.5 years	

Only six patients (8.82%) presented within 6 hours of onset of symptoms. Over 69.12 % presented to the hospital after 24 hours of onset. The mean duration was 62.87±30 days. At the time of presentation, 43 patients (63.24%) had experienced testicular pain in the past. One patient developed torsion following herniotomy; another patient had torsion from an undescended testis, while 2 patients developed torsion while playing football. There were no precipating events in 64 patients (94.12%). Nine patients had bilateral torsion while 34(30.00%) and 25(36.76%) had torsion on the right and left testes respectively.

The contralateral testes was oblique in thirty seven (54.4%) of patients. Forty patients (58.82%) were found to have scrotal swelling. The ipsilateral testes were found to be oblique and horizontal in (n=25; 36.76) and (n=37; 54.4%) respectively. Six patients (8.82%) had atrophic testes on the contralateral side at the time of presentation. Only six patients (8.82%) had fever at the time of presentation Eighteen patients (26.47%) first presented to the patent medicine dealers. A lot of patients (36.47%), first presented to the general physician while only 21 patients (30.88%) presented first to the urologist. Table 3 shows the effect of duration of symptoms before presentation on the salvage of the testes. There was statistically significant difference in outcome of treatment when the outcome was matched with the duration of symptoms before presentation. Patients who presented after 24hours had much higher chance of testicular loss and atrophy. This was statistically significant (p=0.001). Eighteen patients (26.47%) first presented to the patent medicine dealers.

Thirty-three patients (48.53%) presented with acute testicular torsion while (n=35; 51.47 %) presented as intermittent testicular torsion. The most common presentation was scrotal pain (n=64; 94.12%). The mode of presentation is shown in table 2.

Table 2

Presentation and complaints

Presentation	Frequency (n=68)	Percentage (%)
Acute torsion	33	48.53
Intermittent	35	51.47
Complaints		
Absent testis	1 1.47	
Pain	64	94.12
Swelling	2	2.94
Atrophy	1	1.47

At scrotal exploration, 32 patients (47.06%) had gangrenous testes and therefore had orchidectomies; 36 testes (52.94%) were considered viable and were fixed. The initial salvage rate was 52.94%. After follow up for 6 months 12 of the initially salvaged testes were found to be atrophic. After six months, only 24 patients (35.29%) had satisfactory outcome while the outcome was considered unsatisfactory in 44 patients (64.71%). The unsatisfactory outcome included the patients who had orchidectomy as well as those with subsequent atrophy after orchidopexy.

Table 3
Duration and outcome

Duration	**Outcome**	**Total**		**X^2 (p-value)**
	Initial salvage	**Loss**		
6 hours	6 (16.67)	0 (0.0)	6 (8.82)	
12 hours	3 (8.33)	0 (0.0)	3 (4.41)	
24 hours	8 (22.22)	4 (12.50)	12 (17.65)	
1 week	5 (13.89)	23 (71.88)	28 (41.18)	
1 week and above	14 (38.89)	5 (15.63)	19 (27.94)	26.02 (*0.001*)*
Total	**36**	**32**	**68**	
	Satisfactory	**Unsatisfactory**		
6 hours	6 (25.0)	0 (0.0)	6 (8.82)	
12 hours	3 (12.50)	0 (0.0)	3 (4.41)	
24 hours	7 (29.17)	5 (11.36)	12 (17.65)	26.39 (*0.001*)*
1 week	4 (16.67)	24 (54.55)	28 (41.18)	
1 week and above	4 (16.67)	15 (34.09)	19 (27.94)	
Total	**24**	**44**	**68**	

**Statistically significant (p≤0.05)*

A statistically significant association existed between reported after 24 hours have a 6.26 more odds of treatment and duration (OR=6.26, 95%CI=1.62-26.32, having Orchidectomy than those that reported earlier. p-value=0.01). This result shows that patients who This is illustrated in Table 4.

Table 4
Duration and treatment using a univariate logistic regression

Duration	Treatment		*Odds ratio (OR)*	*P-value*	*95% Confidence interval (CI)*
	Orchidectomy	Orchidopexy			
> 24 hours	28	19	6.26	0.01*	1.62-26.32
≤ 24 hours	4	17			

**Statistically significant (p≤0.05)*

The place of first presentation of the patient also contributed to the type and outcome of treatment. Those whose first presented to the patent medicine dealers and general practitioners had mainly orchidectomies when compared to those that first presented to the urologist who had mainly orchidopexy (p-value=0.001).Most patients11(52.38%) who presented to the urologist first had satisfactory outcome and this was statistically significant (p=0.001). Table 5 shows the outcome of treatment according to who first saw the patient. Here also there was statistically significant difference in outcome of treatment. While over 50% of patients that were first seen by the urologist had satisfactory outcomes, the reverse was the case with those first attended to by general practitioners and patent medicine dealers (p-value= 0.001).

Table 5

First call and outcome

First call	**Outcome**		**Total**	**X^2 (p-value)**
	Salvage	**Loss**		
Patent medical dealer	6 (16.67)	12 (37.5)	18 (26.47)	
General Practitioner	11 (30.56)	17 (53.13)	28 (41.18)	14.82 (*0.02*)*
Self	1 (2.7)	0 (0.0)	1 (1.47)	
Urologist	18 (50.0)	3 (9.38)	21 (30.88)	
Total	**36**	**32**	**68**	

*Statistically significant (p≤0.05)

DISCUSSION

An average of 17 cases of testicular torsion was seen per year in our institution. This shows that condition is fairly common. This is similar to the picture in another study from North Central Nigeria but much more than studies from South-East Nigeria5, 14. There was no seasonal variation in prevalence in this study.

Regional and seasonal variations have been reported elsewhere15. Increased cremasteric activity during cold season has linked to increased incidence during cold season in Jos and Brazil5, 16. Port Harcourt is a city in the topical rain forest zone with high humidity which is relatively warm all-round the year. Two types of testicular torsion may occur: (intravaginal and extravaginal). The tunica vaginalis is usually attached securely to the posterior lateral aspect of the testicle, and, within it, the spermatic cord is not very mobile1.

Intravaginal torsion is secondary to the lack of normal fixation of the posterior lateral aspect of the testes to the tunica vaginalis. This results in the testis being free to swing and rotate within the tunica vaginalis of the scrotum. This defect is referred to as the 'bell-clapper deformity'. This occurs in 1217% of all males and is bilateral in

around 40% of cases1.All cases of testicular torsion in this study were intra-vaginal except one. This was the picture in other studies in Nigeria5.

By contrast, neonates more often have extravaginal torsion as was the case in our patient with who undescended testis. This occurs because the tunica vaginalis is not yet secured to the gubernaculum and, therefore, the spermatic cord, as well as the tunica vaginalis, undergoes torsion as a unit. Extravaginal torsion is not associated with bell clapper deformity1. Neonates may also have intravaginal torsion in this study a patient had iatrogenic torsion following herniotomy. Two patients developed torsion while playing football; no immediate precipitant can be identified for the rest of the patients.

Although congenital anomalies predispose to torsion, the cause of testicular torsion is unknown but cold temperature, sudden movement or trauma, coitus, staining and increased testicular growth due to testosterone surge at puberty has been implicated1,5,9 . It is thought that the increased weight of the testicle after puberty, as well as sudden contraction of the cremasteric muscles (which inserts in a spiral fashion into the spermatic cord), is the impetus for acute torsion1.Testicular torsion may also be associated with testicular malignancy, especially in adults; one study found a 64% association of testicular torsion with testicular malignancy1.

This is thought to be secondary to a relative increase in the broadness of the testicle compared with its blood supply Testicular torsion can occur at any age, the incidence is 1 in 4000 for men younger than 25 years17.The mean age of presentation from this study was 24.6 ±5.5 years and this was similar to reports by Ugwu and Ibrahim who mean ages of 22.7 and 23±17.5 years and respectively 5, 18. In temperate climes the peak age of intravaginal torsion much lower at about 12 to 16years but tends to present later in the tropics9. The reason for the aforementioned geographical age difference is not clear.

The most common presentation of testicular torsion is acute severe scrotal and abdominal pain5, 9. Urinary tract symptoms like frequency and dysuria are unusual.9 In this study pain was the most common presentation (n=64; 94.12%).

This pattern of presentation was also noticed in other studies5, 9. Majority of the patients (n=62;91.18%) presented without fever and this is in keeping with other studies done in other parts of the world1,9. Presence of fever indicates that gangrene may have set in as was seen in 6 patients in this study. Torsion may be categorized as complete, incomplete, or transient19.

Initially, torsion is sufficient only to obstruct venous outflow (incomplete torsion, less than 360 degrees), resulting in the gradual increase in intratesticular pressure and resistance. Over time, with an additional twisting of the cord (greater than 360 degrees), the arterial inflow is also obstructed, and the testis becomes entirely ischaemic and is known as complete torsion20, 21. Thirty-five patients presented with intermittent testicular pain while 33 patients had acute testicular torsion. This is similar presentations were noted by Hayn et al6. The pain is related to the degree of ischaemia which is directly proportional to degree of twisting the cord undergoes5.

Torsion occurred more on the right side and this is similar to the study carried out by Ibrahim AG et al18 and it is at variance with the study by Fan R et al who reported a left predominance22. Nine patients had bilateral torsion. They all had horizontal testes at presentation. Some authors have reported bilateral testicular torsion1, 9. Eighteen patients (26.47%) presented first to the patent medical dealers. Here, wrong diagnosis and delayed referral to appropriate health facility results in loss of testes.

In Nigeria a patent medicine dealer is an individual without formal training who sells orthodox pharmaceutical products for profit, and they provide a main source of treatment for many illnesses23. Improper health seeking behaviour contributes to lack of proper healthcare in Nigeria. This may be the reason why these patients with torsion present to the patent medical dealers23. Most of the patients that presented first to the patent medical dealers had testicular loss and most patients that presented to the urologist first had salvaged testes. The patent medicine dealer is ill equipped to manage a case of testicular torsion.

Twenty-eight patients presented first to the general practitioner and sixteen of them had orchidectomy and twelve had orchidopexy. Some patients also presented to the general practitioner and had antibiotics and were only referred later when pain persisted. This is because they were often wrongly diagnosed as epididymo-orchitis at the time they were referred the damage had been done and only 6 testes could be salvaged. Time is of essence in management of torsion. Prompt recognition and treatment are necessary for testicular salvage. In this study only 6 patients presented within 6 hours of onset of pain. Forty-seven patients presented after a week. Most of the patients (n=59; 86.76%)) presented at 24hours or more and this was similar to the study carried out Ugwu et al in Jos where 75.4% presented after 24hours5. The reasons for late presentation include shame and poor access to health facilities17, 18. Treatment in this case was orchidectomy as the testes were no longer be viable during scrotal exploration Scrotal exploration, detorsion and orchidopexy of both the ipsilateral and contralateral testes is the best and most appropriate treatment for testicular torsion. Manual detorsion using medial to lateral rotation has been can be attempted while waiting for definitive surgery. If successful, it can restore blood flow and provide temporary pain relief 3. However, there are new studies with focus on the post-surgical setting looking at medical treatments that may limit reperfusion injury and help preserve testicular function3. The initial salvage rate in this study was 54.42%, this was lower than the rates in Korea and Turkey11, 13. Patients from above countries often seek medical attention early. This may explain the relatively high salvage rates. In contrast, only 9 patients presented before 12 hours in our study. The low salvage rate in this study could be explained by the inappropriate and delayed treatment. All the patients had scrotal exploration once the diagnosis was made. There was minimal delay between presentation and exploration as all patients were explored using local infiltration of local anaesthetic agent. Studies carried out by Rampaul et al also revealed that most delays occurred outside the hospital24.As has been previously reported, not all the testes that were considered viable after detorsion and orchidopexy remained of same size month's later 14. After six months follow up, a third of the initially salvaged testes became atrophic in this study. There is therefore the need to redefine the outcome of orchidopexy. We have proposed the use of ''initial salvage'' to denoted the testes that were considered viable at scrotal exploration and ''satisfactory outcome '' to denote those that did not undergo atrophy after the period of follow up; while the ''unsatisfactory outcome'' will include the gangrenous testis at the time of exploration and those that undergo atrophy after orchidopex.

CONCLUSION

Testicular salvage rate is low in Port Harcourt. Inappropriate initial diagnosis and delayed definitive treatment from ignorance and misdiagnosis are the major contributors to the poor salvage of testis. Use of local anaesthesia was found to be safe, effective time and saving. Health education to create a change in the health seeking behavior of the populace, bringing health care facilities closer to the people; prompt evaluation and treatment of testicular torsion would help to improve testicular salvage rate. Continuing medical education would also lead to early identification and prompt referral of patients with suspected testicular torsion to the urologists. At any point when there is a doubt in diagnosis, a scrotal exploration should be carried out.

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