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Renal Function of Post Neonatal Tetanus Cases as seen in University of Port Harcourt Teaching Hospital

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ABSTRACT

Background: Acute kidney injury (AKI) is a known complication of tetanus and contributes to morbidity and mortality among children with tetanus. The aim of this study was to ascertain the renal functions in patients with post neonatal tetanus over a 4year peroid.

Methods: All cases of post neonatal tetanus admitted into the department of Paediatrics UPTH between October 2009 to April 2013 were recruited and studied. The renal function studies done included urinalysis, serum electrolytes, urea and creatinine, renal ultrasound scan and fluid input and output monitoring.

Results: 17 cases of post neonatal tetanus were studied. There were 9(53%) males and 8(47%) females giving a male female ratio of 1.1:1. The ages of the patients ranged from 2-16years with a mean age of 9.81±4.4years. Most cases were above 5years of age(13(76.5%). Of the 17 cases only 2(11.8%) were fully immunised. The mean laboratory values were: serum creatinine 55.8±4.9umol/L, urea 2.5±1.1mmol/L, sodium 132.8±3.3mmol/L, potassium 3.6±0.7mmol/L and bicarbonate 22.3±4.9mmol/L which were all within the normal range for our laboratory. The urinalysis and renal ultrasound findings were also normal. None of our patient had oliguria.

Conclusion: AKI as a complication of post neonatal tetanus is uncommon in paediatric patients.

INTRODUCTION

Tetanus is an infection caused by Clostridium tetani an ubiquitous gram positive spore forming anaerobe found in the soil, faeces or rusty material. Oruamabo(2007),Wilkins et al (1998),Pinder (1997). Infection commonly occurs by contamination of wounds by spores of C.tetani which produces a neurotoxin called tetanospasmin at the site of primary innoculation which is responsible for the clinical manifestations of the disease. Oruamabo(2007), Pinder(1997).

The incubation period (time from injury to first symptom) averages 7-10 days with a range of 1-60 days. The onset time (time from first symptom to first spasm) varies between 1-7 days. Shorter incubation and onset times are associated with more severe disease. Cook et al (2001). In the most common form of tetanus the first symptom is usually spasm of the jaw muscles (trismus or lock jaw) and subsequently spasm spreads to the other parts of the body leading to stiffness of the neck, dysphagia, stiffness of the abdominal muscles and back, recurrent muscle spasms. Other symptoms/signs include fever, tachycardia, bradycardia, hypertension, hypotension, sweating, excessive salivation due to autonomic instability. Cook et al (2001), Mallick and Winslet (2004), Seydi et al (2005).

The complications of tetanus are multi-systemic. Life threatening complications include respiratory, cardiovascular and renal amongst others. Acute kidney injury (AKI) is a known complication of tetanus occurring in 15-39% of cases. Martinelli et al (1998), Daher et al (1997).The pathophysiological mechanisms for kidney injury include autonomic dysfunction and rhabdomyolysis due to uncontrolled muscle spasms. Martinelli et al (1998), Daher et al(1997). Other contributory factors may include sepsis and use of nephrotoxic drugs. Kaur et al (2014), Moura Filho et al (2008). Studies have shown that up to 50% of patients with tetanus have GFR lower than 50ml/min in the 1st and 2nd week of hospitalization. The renal dysfunction in tetanus is reported to be mild, non oliguric, has early onset and not related to severity of the disease. Martinelli et al (1998), Daher et al(1997).

Tetanus though a vaccine preventable disease remains a major cause of morbidity and mortality among children in Nigeria. Ojini and Danesi (2005). Post-neonatal tetanus is a growing problem in Nigeria because it is yet to receive the attention it deserves in most developing countries, in comparison with neonatal tetanus in terms of, institution of preventive and control interventions. Oyedeji et al (2012). There is a dearth of knowledge on the renal functions of patients with post neonatal tetanus. The aim of this study was to ascertain the renal functions of Post neonatal tetanus cases admitted into the University of Port Harcourt Teaching Hospital.

MATERIALS AND METHODS

This was a prospective descriptive study conducted at the University of Port Harcourt Teaching Hospital (UPTH). The hospital is a tertiary institution that serves as a major Paediatric referral center for neighbouring states. Diagnosis of tetanus was clinical in all cases based on case definition criteria from previous studies. Akani et al (2004), Oyelami et al (1996),Gbadegesin et al (1996), Anah et al (2008). Consent was obtained from parents/care givers and patients where possible.

All cases of post neonatal tetanus admitted into the paediatric department of UPTH between October 2009 to April 2013 were recruited and studied. Details obtained included age and sex of the patient, clinical presentation, patients immunisation status, parents level of education, marital status of parents, length of hospitalisation, complications and outcome.

All cases were admitted into the tetanus side room of the children's ward, urinalysis, serum electrolytes, urea and creatinine, renal ultrasound scan was done and urine output monitored to ascertain renal function of the patients studied. They all received anti tetanus serum (ATS), IV antibiotics and spasms were controlled with a combination of phenobarbitone, chlorpromazine and diazepam.

Data was analysed using SPSS Package 16.0.

RESULTS

The total number of post neonatal tetanus cases admitted within the study period was 17 and all were recruited for the study. The year 2011 had the highest number of admissions (6(35.2%) cases) compared to other years. Table 1 shows the characteristics and outcome of the children with post neonatal tetanus.

The ages of the patients ranged from 2-16years with a mean age of 9.81±4.4years. Most cases were above 5years of age (13(76.5%):10 of them (58.8%) were above 10years, 3(17.6%) between 5-10years, 4(23.5%) below 5years of age. 9(53%) cases were males while 8 (47%) were females with M:F of 1.1:1.The sex difference was not statistically significant.

Among the 17 children with tetanus, spasm, trismus, neck stiffness, chestpain, risus sardoincus, opisthotonus posture, fever, cyanosis and apnoea were recorded in 17(100%), 7(41.2%), 11(64.7%), 3(17.6%), 5(29.4%), 7(41.2%), 6(35.3%), 1(5.9%) and 3(17.6%) of the patients respectively.

The commonest portal of entry for tetanus was trauma in 16 (94.1%) out of which 11(64.7%) of them were via broom stick injury.

Of the 17 children with tetanus, only 2(11.8%) received complete doses of tetanus toxoid according to the National Program on Immunisation (NPI) Schedule, 6(35.3%) were not immunised at all, 7(41.2%) were incompletely immunised and the immunisation status of 2(11.8%) could not be ascertained.

Most of the mothers whose children had tetanus had primary or no formal education, 2 (11.8%) had no formal education, 10(58.8%) had primary education, 2 (11.8%) had secondary education and 3(17.6%) had tertiary education.

The result of urinalysis and renal ultrasound scan were normal. The mean laboratory values for the serum electrolytes/urea and creatinine were : serum creatinine 55.8±4.9umol/L, urea 2.5±1.1mmol/L, sodium 132.8±3.3mmol/L, potassium 3.6±0.7mmol/L and bicarbonate 22.3±4.9mmol/L which were all within the normal range and none of our patient had oliguria.

The duration of hospital stay ranged between 7-35 days, of these only 2 children had hospital stay of < 7days and these 2 children died. None of the children who died was fully immunized (1 was incompletely immunized and 1 was not immunized at all). Of all the cases with tetanus, data on the outcome of 5 patients were missing, 9(75%) were discharged home, 1(8.3%) absconded and 2 died (16.7%).

Table 1: Characteristics and outcome of the children with post neonatal tetanus

Characteristics	Total	Percentage
Age groups		
< 5years	4	23.5%
5-10years	3	17.6%
>10years	10	58.8%
Sex		
Male	9	53%
Female	8	47%
Outcome		
Discharged	9	75%
Absconded	1	8.3%
Missing	5	
Death	2	16.7%
Mother's education status		
No formal education	2	11.8%
Primary education	10	58.8%
Secondary education	2	11.8%
Tertiary education	3	17.6%

DISCUSSION

Tetanus is a largely preventable disease which can be eliminated through effective immunization but still remains a major health problem in Nigeria. Alhaji et al (2013). Infection does not confer immunity. Prevention is through vaccination which is highly safe and efficacious. Active immunisation should be instituted in all partially immunised, unimmunised persons and those recovering from tetanus. Tetanus vaccine according to the NPI schedule in Nigeria was administered in the 3dose immunization regimen during infancy as DPT (Diphtheria, Pertussis and Tetanus) combination which has been replaced by the Pentavalent vaccine regimen (Diphtheria, Pertussis, Tetanus, Haemophilus influenza type b and Hepatitis B). These 3doses of tetanus vaccine given in infancy does not confer lifelong immunity against tetanus, this should be followed by a booster dose at 18months, at 5 and 10years since the level of immunity after vaccination in infancy usually wanes off with time. Bhatia et al (2002). Most cases of post neonatal tetanus in our study was recorded among children above 5years of age which is consistent with the findings of other workers in Nigeria. Oyedeji et al (2012), Oyelami et al (1996), Alhaji et al (2013),Yaguo Ide and Nte (2011). There was no significant sex difference in cases of tetanus seen in our study which contrasts with the reports from previous studies. Ojini and Danesi (2005), Oyedeji et al (2012),Oyelami et al (1996), Yaguo Ide and Nte (2011), Yaguo Ide and Nte (2012).

AKI as a complication of tetanus was not seen in any of our patients however in the study carried out by Moura Filho et al ((2008) the prevalence of AKI was reported to be 11.8% while a higher prevalence of 34% was recorded by Hilton et (2006). These studies were however among adults.

The case fatality rate (CFR) of tetanus in our study was 16.7%, this is comparable to the CFR of

18.2% and 18% reported by Oyedeji et al (2012) and Alhaji et al (2013) respectively. However, in a previous study carried out between 1995-2009 in UPTH by Yaguo-ide and Nte (2011) a higher CFR of 30.5% was reported, this may probably be attributed to better immunization coverage in the years after this study. Ojini et al and Danesi (2005)and Adekanle et al (2009) recorded CFR of 36.9% and 33% respectively, this higher CFR may be because in their study adults were also included and the CFR in adults was higher compared to the children studied in the same study. On the contrary, Moura Filho et al (2008) reported a lower CFR of 9.4% probably because the study was carried out in a developed country (Brazil) with a better immunization coverage compared to Nigeria thus reflecting the inadequate and ineffective tetanus immunization programme in Nigeria. WHO(2014).

CONCLUSION

AKI as a complication of tetanus is uncommon in paediatric patients.

RECOMMENDATION

The NPI schedule should be expanded to include booster doses at 18months, 5years and 10years according to previous recommendations.

We recommend improvement in the level of awareness about tetanus and the importance of immunization.

Parents/care givers should be discouraged from using potentially harmful objects like broomstick to flog children.

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