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FIVE YEARS STUDY OF MORTALITY AND MORBIDITY PATTERNS OF TETANUS CASES IN A TERTIARY CARE PICU (PEDIATRIC INTENSIVE CARE UNIT), MULTAN PAKISTAN.

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ABSTRACT… Objectives: Tetanus is an avoidable disease. Significant reduction in the incidence of tetanus is observed around the globe but in Pakistan, its incidence is still high. The objective of current study was to determine the demographic, clinical features, outcome and complications of tetanus patients admitted in Pediatric Intensive Care Unit (PICU). **Study Design:** This Descriptive-observational study. **Setting:** At PICU of The Children Hospital & ICH Multan Pakistan. **Periods:** 1st January 2013 to 31st December 2017. **Material and Methods:** A total of 77 tetanus cases admit through the study period in PICU. Clinical features, complications, duration of stay and outcome of 77 tetanus cases during study period were noted. **Results:** Amongst a total of 77 cases, 62 were male (80.6%) and 15(19.4%) female. Most (57.1%) were between 2 to 7 years. Twenty five (32.4%) were unvaccinated, 52 (67.6%) partially vaccinated. According to the grade of severity (Ablett classification), majority (40) were of grade-III. Regarding the outcome, 15 (19.5%) expired. **Conclusion:** Tetanus is a fatal disease with high mortality rate. Vaccination and right management of the disease are the best options to minimize the load of tetanus in our country.

Key words: Burden, Mortality Outcome, PICU, Tetanus, Vaccination.

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INTRODUCTION

A significant decline in the incidence of tetanus is accounted from around the globe but in numerouscountries, it represents a huge threat.[1] In Pakistan, immunization isn't accessible to many for different reasons. Mortalityfrom tetanus approaches close to 50% in developing countries like Pakistan.[1,2]

In Pakistan, Tetanus is a non-reportableailment and its incidence is not well archived. Prophylaxis against tetanus desiresimmunization with tetanus toxic and methods to accomplish good wound hygiene.[3] Variation in death rates from tetanus is seen credited to variety in access to proper medical care.[3]

Clostridium tetani is the reason for Tetanus. It collects a solid neurotoxin tetanospasmin which interferes with the CNS.[4] Tetanus is for all intents and purposes entirely preventable through vaccination. Worldwide frequency of tetanus is ~1million cases every year with case casualty extending 20-50%.[5]

Tetanus occurs sporadically affecting either non-vaccinated or those who are incompetent to uphold their immunity statusthrough booster doses of vaccine. Vaccination at an earlier agehas been advocated to improve immunity to counter tetanussucceedingwell-timedboosters.[6,7] Tetanus is a noncontiguous,[8] classically exhibits as lockjaw, difficulty in swallowing, risussardonicus and neck stiffness.[9]

Management comprise of the avoidanceof Tetanus Toxin absorption, symptomatic treatment, antibiotics to eradicate the remaining organism andcare of wound. Severe advanced tetanus cases call forcare with sedation, airway protection and well-ordered ventilation.[10,11] Autonomic dysfunction is common with events of tachycardia, raised blood pressure and sweating.[12] Fatigue, asphyxia, aspiration pneumonia and autonomic

nervoussystem variability are recognized to be the roots of death with tetanus.[13-15]

Acute penetrating skin damage is the commonest feature of tetanus cases[5], while ulcers, snake bite, burns, gangrene, otitis media, child birth, IM/ IV injections and surgical procedures have also been associated with tetanus.[16]

Outbreaks of tetanus linked to injuries from natural calamities (like earth quakes and tsunamis) are well documented.[17-21] Tetanus is still endemic in Pakistan especially amongst therural areas. Thefrequency andmortality related to tetanus is highin several studies conducted in different parts of Pakistan.[22-25]

Inadequacy of knowledge and absence of education donate to perceptions about risk factorsand fatality caused by tetanus in Pakistan. Our aim was to share our five year experience of demographic, clinical features, outcome and complications of tetanus patients admitted in Pediatric Intensive Care Unit (PICU).

METHODS

A total of 77 children were admitted in PICU (as per hospital admission policy) with the clinical diagnosis compatible with tetanus. All were aged between1 month to 15 years. Public tertiary care hospital of Multan, Pakistan, was the place for this study from 1st January 2013 to 31st December 2017 cases. Known cases of epilepsy, with significant cardiac dysfunction, hepatic, respiratory or renal impairment were excluded. Patients who did not consent for the study or lost follow-up were also excluded. Detailed history was taken and thorough examination was done along with investigations. Diagnosis was made and patients or their attendants were explained about the diagnosis and treatment. Severity of tetanus was classified according tothe system reported by Ablett.[4]

Special focus was on care of wound, antibiotics and anticonvulsants use (as per ward criteria). Active immunization was also completed. Patients of grade II, III & IV tetanus were admitted in PICU. Avoidance to light and noise were maintained by keeping children in isolation room of PICU along with aseptic measures.

All patients were kept on nothing orally, IV fluids started with partial parental nutrition or TPN started as required. Nasogastric tube & Foleys catheter passed. Patients with Grade I Tetanus were not shifted in PICU, they were kept ingeneral ward & put on liquid diet so they were not included in the study. Debridement of wound was performed in patients with contaminated wound followed by daily dressing. Patients who developed hypoxia were given Oxygen orventilator support. In patients with uncontrolled fits, tracheotomy was made. Patients were discharged from hospital once they tolerated feed well & their spasm or fits werecontrolled on oral medication. Follow-up visitswere advised at 10 days, 1 & 3 months.

Data was collected on preformed forvariables related to demography, clinical details, stage of presentation, co morbid illness, site ofinjury & history of tetanus vaccination, incubation period, management, outcome and complications. The data were analyzed using SPSS version 16. Descriptive statistics were appliedon demographic variables like age, gender. Qualitative variables were presented as Mean andstandard deviation like age. Qualitative variables were presented in percentage and frequencies like incubation period, co morbid illnesses, complication and mortality.

RESULTS

Out of a total of 77 cases of tetanus, 62 (80.6%) were male and 15 (19.4%) female. Majority, 44 (57.1%) were between 2-7 years. Twenty five (32.4%) had no vaccination, 52 (67.6%) partly vaccinated. We noted that not even a single case had proper vaccination (as required for age).

Otogenic tetanus was found in children of 2-7 years. A total of 44 had post injury tetanus, 30 had lower limbs affected. No identifiable portal of entry was noted in the remaining cases.

Mean incubation period (IP) of 5 days was found in post trauma children. Stiffness of the body,

locked jaw and difficulty in swallowing turned out to be the most frequent complaints. Most children, 40 (51.9%) belonged to grade III, 16 (20.7%) grade IV while zero grade I.

Alteration in sensorium was not noted in most cases (65). Regarding the outcome, 62 (80.5%) cases were shifted to ward and 15 (19.5%) expired mostly of grade IV.

Less than 72 hours was the time for onset in all severe cases. Majority, 42 (54.5%) stayed for more than 3 weeks and 5 (6.5%) for more than 6 weeks.

Intubation was done 18 (23.4%). Average duration of 12 days was noted for mechanical ventilation (10-14 days). During PICU stay, sixteen (20.8%) had autonomic instability which desired isotropic supports. For complications, LRTI was reported in 15 (19.4%), hypotension in 25 (32.4%), AKI (accordingto rifle criteria) in 15 (19.4%), sepsis in 18 (23.3%), paralytic illus in 35 (45.4%).

Characteristics		No. of Cases (%)
Gender	Male	62 (80.6%)
	Female	15 (19.4%)
Age (years)	<2 years	5 (6.4%)
	2-7 years	44 (57.1%)
	>7 years	28 (36.3%)
Vaccination Status	Unvaccinated	25 (32.4%)
	Partially vaccinated	52 (67.6%)
Mode of acquiring tetanus	Otogenic	5 (6.4%)
	Post injury	44 (57.1%)
	Unknown	28 (36.3%)
Common symptoms	Truisms	77 (100%)
	Dysphagia	70 (90%)
	Body stiffness/spasm	65 (84.4%)
Grade of Severity	I	0 (0%)
	II	21 (27.2%)
	III	40 (51.9%)
	IV	16 (20.7%)
Outcome	Survived	62 (80.5%)
	Expired	15 (19.5%)
Length of stay	1-10 days	4 (5.1%)
	11-20 days	16 (20.7%)
	21-30 days	52 (67.5%)
	>31 days	5 (6.4%)
Complications	LRTI (lower respiratory tract infection	15 (19.4%)
	Hypotension	25 (32.4%)
	AKI	15 (19.4%)
	Sepsis	18 (23.3%)
	Paralytic ileus/constipation	35 (45.4%)

Table-I. Characteristics of tetanus patients (n=77)

DISCUSSION

In the current study, tetanus was found to be most common in the 2-7 year age group, which is also shown by Tulu M.S et al from Mumbai India.[26] Naseem F et al found maximum tetanus patients in 2-6 years of age in Karachi Pakistan which again well correlates with our findings.[27]

Male predominance (80%) was seen because the boys are more involved in outdoor activates as compared to girls.[5] Contrary to this Naseem F et al showed almost equal ratio of male and female tetanus patients a PICU of Karachi Pakistan although more males were noted in post trauma cases.[27] Narang M et al from Delhi showed 62% males in post neonatal tetanus patients.[28]

As far as portal of entry is concerned, Otogenic route was exclusively confined to the 2-7 year age group (n=5, 6.4%) as otitis media is mostly seen in this age group. Introduction of unclean fingers and contaminated objects into the ears is also common in this age.[10] Naseem F et al showed almost same age group for high frequency of otitis media as portal of entry.[27] Narang M et al from Delhi showed a very high frequency (60%) of ear discharge in post neonatal cases.[28]

Regarding the vaccination status, 25 cases were unvaccinated, 52 were partially vaccinated (only BCG & OPV at birth) and none was appropriately vaccinated for age. Naseem F et al also showed high frequency of unvaccinated (73%) and partially vaccinated (26%) children.[27] It seems to be the reflection of poor coverage of our immunization programmed in our country. In adult studies in Pakistan Talpur A et al[29] showed 48%, Muazzam M et al[30] showed 76% cases who were unimmunized or unaware of the immunization status. Unlike other diseases, tetanus is entirely preventable by immunization.[31] A five dose regimen of tetanus taxied provides adequate immunity. Routine tetanus booster vaccination is recommended for adolescents and adults, every 10 years.[32] It was noted that none of our patients was vaccinated for tetanus, which is very alarming because despite the continuous efforts of health sector, vaccination status of our children in general is falling and currently it is approx. 54% (for all vaccine preventable diseases).[33] Since Pakistan is an agricultural state and the disease is common where soil is cultivated, in rural areas, warm climates and among males, so being a tetanus prone country, vaccination against tetanus is imperative for our children.[5]

In our study we found truisms in all cases, dysphagia in 70(90%) and body stiffness in 65(84%). These findings are consistent with a lot of other reported studies.[5,18,19,26,34] Hence a high index of suspicion for tetanus should be exercised whenever patients present with any of these symptoms irrespective of history of trauma.[5]

There are many scoring systems for grading the severity of tetanus. We adopted the Ablettclassification.[35] In our study we found that our patients 40(51.9) were in grade III, 21(27.2%) grade 11 and 16(20.7%) in grade 1V. Our findings are consistent with Naseem at el[26] that also had minimum grade III cases. It may be due to the fact that less severe cases are often treated in primary and secondary health care systems and are referred infrequently. Regarding the length of stay 52(67.5%) had a prolonged stay of 20-30 days. Tetanus patients usually require lengthy ICU stay. As proved by our study and supported by previous other studies, the longer the duration of hospital stay, the more favorable theoutcome.[34]

Autonomic dysfunction is common in tetanus.[36-38] It usually starts by the end of 1st week of illness and persists for 1-2 weeks. It is due to the effect of tetanus toxin on the brain stem and autonomic interneurons. Although it is mainly due to paroxysmal increases in sympathetic activity resulting in hypertension, tachycardia and pyrexia, at times there is parasympathetic over activity resulting in hypotension and bradycardia added by heavy doses of benzodiazepines and othersedatives.[39] In our study we found autonomic dysfunction in 20.7% (16) of cases and these contributed to maximum mortality. In an adult study in Pakistan the autonomic dysfunction was found to be 12%.[29] Paralytic illus was seen strikingly high in our sudy45.4% as compared to other local study in Pakistan 13%.[29] Hypotension was found in 25(32.4%) cases all

of which needed inotropic support to maintain BP between50th and 90th centile. It was much less than found by Naseem et al which showed 73.91% cases developing hypotention.[27]

Regarding the outcome, tetanus has a mortality rate ranging between 20 to over 50% as mentioned in variousstudies.[5,19,26,27,37,40] Mortality rate was 19.5%(15) in our study and 80.5%(62) cases survived. In another study in Pakistan the mortality rate was 26%.27 Most of the cases with grade IV severity, having severe autonomic instability and respiratory compromise needing mechanical ventilation expired.

CONCLUSION

Tetanus is a fatal disease with high mortality rate. Complete vaccination and proper management of the diseased cases are the best options to reduce the burden of tetanus in our country.

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3	Muhammad Tariq Aziz	Methodology, Literature review, Discussion.	
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