Original Article

Outcome of Neonatal Tetanus in Hospitalized Patients

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ABSTRACT

Objective: To determine the outcome of neonatal tetanus in hospitalized patients.

Study Design: A hospital based cross sectional study.

Place and Duration of Study: This study was conducted in Children Hospital Quetta from April 2011 to March 2012.

Materials and Methods: A hospital based cross sectional study was conducted to determine the outcome of neonatal tetanus. 60 full term neonates from 0 to 28 days of age were included in the study after fulfilling the criteria of tetanus. Diagnosis was established exclusively on clinical grounds.

Results: Mean age of presentation was 7.5 days, male female ratio was 3:1. Most common presentation was generalized seizure in 51. 5 % cases, 30.1 % presented with lock jaw, 15.1% presented with opisthotonos and only 03. 3% presented with poor sucking. 92 % mothers were illiterate, 85% belong to the low socio economic status, 78% were from rural area, 75% delivered at home, immune status was low in 70% mothers, cord was cut by non sterilized equipments in 65%, cord was tied with unclean thread in 60%, unhygienic material was applied to the cord in 54%, and 25% developed tetanus after circumcision done by non sterilized instruments at home. 25 out of 60 neonates died and the overall mortality rate was 40.1% out of 60 cases, 24 were put on ventilator and 9 of them (37.5%) died, while out of 36 unventilated cases 16 (44.4%) died.

Conclusion: The findings of the study demonstrate that the high mortality rate of neonatal tetanus is due to lack of knowledge of risk factors. Lack of maternal education, low immune status of mothers against tetanus along with unsafe and unhygienic delivery practices are major risk factors responsible for the development of neonatal tetanus.

Key Words: Neonates, Tetanus, Umbilical cord, Outcome.

INTRODUCTION

Tetanus is derived from Greek word Tetanos "taut", and Teinein "to stretch"[1]. It is a medical condition characterized by a prolonged contraction of skeletal muscle fibers caused by a neurotoxin produced by Gram Positive, anaerobic bacterium Clostridium tetani. Tetanus account for approximately 36 % 0f neonatal mortality worldwide[2]. Neonatal tetanus is the disease of developing countries and 0.5% of total neonates die of this disease every year[3]. Neonatal tetanus is a major health problem in Pakistan too, being one of the common causes of deaths especially in rural settings[4]. Neonatal tetanus usually occurs through infection of umbilical stump, particularly when the stump is cut with a non-sterile instrument. Incubation period of neonatal tetanus is 4 to 14 days after birth averaging 7 days. The shorter the incubation period, the more severe the signs[5]. Tetanus often begins with mild spasm in the jaw muscles (lock jaw). The spasm can also affect the chest, neck, back and abdominal muscles. Back muscles spasm often cause arching, called opisthotonus. Poor sucking, irritability, spasticity and opisthotonos are the most common signs and symptoms[6]. Diagnosis of neonatal tetanus is exclusively on clinical grounds with the high index of suspicion. Laboratory tests are useful only to exclude other diseases like sepsis, meningitis and metabolic fits[7]. Mortality tends to be very high, in absence of medical treatment case fatality approaches 100%, with hospital care 10 -60% of cases die, depending upon the availability of intensive care facilities[8]. In developing countries, little is known about risk factors of neonatal tetanus. Maternal immunization status is very important in protection of neonatal tetanus. Tetanus toxoid is actively transported by the placenta from an immunized mother to her fetus providing passive protection against tetanus during the neonatal period and the following month or two of life[9]. Immunization of pregnant women or women of child bearing age with at least two doses of tetanus toxoid is estimated to reduce the mortality from neonatal tetanus 94%[10]. Even before tetanus vaccine available, neonatal tetanus became increasingly rare in most of Europe and North America through hygienic childbirth practices and cord care[11]. This means the factors other than maternal immune status are also play an important role in development of neonatal tetanus. These factors include type of delivery surface[12]; cord care[13], infants bathing practices, attendant's hand washing practices, skin to skin contact between mother and newborn. Some other factors such as maternal literacy level, socioeconomic status and ethnicity are also important. Tropical use of antiseptic (chlorhexidine) to the cord found to be effective in lowering the incidence of neonatal tetanus[14].

MATERIAL AND METHODS

A hospital based cross sectional study was conducted during April 2011 till March 2012. It is conducted to in the Neonatal Intensive Care Unit (NICU) of Children Hospital Quetta after due permission of chief executive of CHQ as it is the NICU of tertiary care unit with best nursing care and instrumental facilities including mechanical ventilation. Total 60 neonates who fulfilled the inclusion criteria were included in the study. Inclusion criteria were the, full term neonates from 0-28 days of age presented with generalized seizures, lock jaw, poor sucking and opisthotonos. All these neonates were admitted in NICU. Neonates with hypoxic ischemic encephalopathy, meningitis, sepsis and metabolic disorder were excluded from the study. These cases may act as effect modifiers and if included in the study sample, would have introduced bias in the study results.

Diagnosis of neonatal tetanus based exclusively on clinical grounds. Investigations like serum electrolytes, liver function tests, renal function tests, csf examination, x ray chest and arterial blood gasses were performed during the course of illness when needed. The risk factors, clinical presentation, complications and outcome of these neonates were recorded in predesigned proforma. Data was analyzed on SPSS version 12.

RESULTS

Total 60 neonates included in the study after fulfilling the criteria of tetanus. 48 out of 60 presented within 7 days of life. The mean age of presentation was 7.5 days. Male female ratio was 3:1. Majority (78%) of the neonates came from rural areas. Most common risk factor was maternal illiteracy (92%). A mother was considered illiterate when she has no formal schooling ever, otherwise she was labeled as literate irrespective of their level of education.

Table No.1: Risk Factors

Risk Factors	% age
Maternal illiteracy	92
Low socio economic status	85
Rural areas (lack of medical facility)	78
Home deliveries conducted by dais	75
Low immune status of mothers	70
Umbilical cord cut by knife or unclean blade	65
Umbilical cord tie with unclean thread	60
Application of unhygienic material to cord	54
Circumcision done by unsterilized instrument	25

Low socio economic status (monthly income of family < 10,000 rupees) was also significant in 85 %; parents were unable to bear the expenses of smallest clinic run by the lady health visitors even. Home deliveries (75%) conducted by dais or untrained persons, low immune status (less than 2 doses of tetanus vaccine during pregnancy) of mother was 70%, umbilical cord tie with unclean thread (65%), cord cut by unsterilized equipment as knife siccessor and unclean blade (60%), application of unhygienic material to the cord like ash, mud, surma and mustard oil (54%) also contributing factors. Only 5% neonates developed tetanus through septic wound after circumcision by unsterilized equipments at home. Most of the neonates had more than one risk factors, such as a neonate of illiterate mother came from rural area, belongs to low socio economic status, delivered at home and applied unhygienic material to the cord at the same time. General seizures was the most common clinical manifestation in 31 cases (51.2%), 18 cases (30.1%) presented with lock jaw, 9 cases (15%) presented with opisthotonus and only 2 (3.3%) came with the compliant of poor sucking.

Table No.2: Clinical Manifestations

Clinical	Cases	% age
Generalized seizures	31	51.5
Locked jaw	18	30.1
Opisthotonus	09	15.1
Poor sucking	02	03.3

Table No.3: Complications

Complications	Cases	% age
Aspiration pneumonia	21	35.2
Renal failure	17	28.3
Intractable seizures	13	21.6
Nosocomial infection	05	08.3
Pneumothorax	04	06.6

Table No.4: Outcome Total: 60

Total	Mechanical ventilated cases		Unventilated cases	
60	24		36	
Expired	Expired	Percent	Expired	Percent
25 (40.1%)	09	37.5	16	44.4

Regarding the outcome, 25 out of 60 neonates were died with overall mortality rate 40.1%. Out of 60 neonates 24 were put on mechanical ventilation after due consent from their parents, 09 were expired and the mortality rate of ventilated neonates was 37.5%, while 16 out of 36 unventilated neonates were expired and the mortality rate of unventilated neonates was 44.4%. Mechanical ventilation did not make any significant difference in outcome of ventilated and unventilated neonates. Most common complication was the aspiration pneumonea in 21 (35.2%) cases, 17(28.3%) developed renal failure, 13(21.6) had intractable seizures, nosocmial infection developed in 5(8.3%) cases. Only 4 (6.6%) had pneumothrox, basically pneumothorax was the complication of mechanical

ventilation as all of them who developed pneumothorax were on mechanical ventilation.

DISCUSSION

Mortality of neonatal tetanus remains as important, yet preventable cause of neonatal mortality. The overall mortality in this study is 40.1% , which is consistent to other studies of Pakistan 44% in Lahore[15], 30.1% in Dadu[16], 43.7% in Bahawalpur[17], 32per 1000 live birth in Loralai (Balochistan)[18]. In the study of Nigeria and Kenya mortality was 20.6[19]and 21per 1000 live births[20]. Although neonatal tetanus accounted for half of all neonatal deaths and one fourth of all infant mortality in some countries during 1980s[21], the situation has not changed much in Pakistan, as was responsible for 38% of neonatal and 18% of all infant mortality. Mortality rate of ventilated neonate in this study was 37.5% and unventilated 44.4%; means mechanical ventilation did not make any significant difference in outcome of neonatal tetanus. Cause of high mortality of neonatal tetanus in Pakistan is because of lack of knowledge of risk factors. Maternal illiteracy (92%) and low socio economic status (85%) were found to be more common risk factors in the study. Due to maternal illiteracy mothers are unaware of the complication of home deliveries by untrained dais under unhygienic condition found in 75%. Because of low socio economic status parents could not approach to even the cheapest private clinics in rural areas where the free medical facilities are not available at Government level. Other important risk factors are cord cut by unsterilized instrument such as knife, scissor and unclean blade in 65%, cord tie with unclean thread in 60%, unhygienic material (ash, mud mustard oil) applied to the cord in 54%. Only 25% developed tetanus after circumcision done by unsterilized instruments. These risk factors are consistent to the study conducted by quddus ref[18]. Aspiration pneumonia, renal failure and intractable seizures were the common complications found in 35.2 %, 28.3% and 21.6% respectively. 8.3% developed nosocomial infections and 4% had pneumothorax after mechanical ventilation. The results of this study revealed that neonatal tetanus is more common in deliveries conducted by untrained persons under unhygienic conditions in rural areas where the immunization status of mothers are also not up to the mark. Neonatal tetanus can be prevented by educating the general public about the risk factors and preventive measures of this fatal disease. Health personal should create awareness at community level and counseling of pregnant women at individual level to encourage safe delivery practices. Free health facilities should provide to the poor communities of rural areas for safe deliveries by trained persons under hygienic condition and better status of immunization of pregnant women against tetanus.

CONCLUSION

The findings of the study demonstrate that the high mortality rate of neonatal tetanus is due to lack of knowledge of risk factors. Lack of maternal education, low immune status of mothers against tetanus along with unsafe and unhygienic delivery practices are major risk factors responsible for the development of neonatal tetanus.

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