

TETANUS NEONATORUM

Pages with reference to book, From 105 To 108

Suleman Daud, Tufail Mohammad, Ashfaq Ahmad (Department of Child Health, Khyber Medical College, Peshawar.)

Abstract

A prospective study is being carried out in the Department of Child Health, Khyber Medical College, Peshawar, to assess various conservative methods in the treatment of Neonatal Tetanus. Out of 100 cases studied over a period of one year, the over-all mortality was 48%. A substantial reduction in mortality was observed by adding Pyridoxine to conservative measures. The mortality in this group was 22.7% as compared to 55.13% in those treated without it. The main complications encountered during the course of therapy were aspiration pneumonia, jaundice and septicaemia. The survivors examined in the follow up clinic were found to be developmentally normal but 80% of them had umbilical hernia (JPMA 31:105, 1981).

Introduction

Tetanus still presents a grave problem in the developing countries (Nour Mand et al., 1970) including Pakistan. Neonatal Tetanus is the most serious form of the disease and tolls a heavy mortality (Bytchenko, 1966). As the disease is self limiting the main aim of treatment should be to prevent its many complications. This can be done by imparting intensive care measures like the use of muscle relaxants and maintenance of respiration by mechanical respirators (Symthe and Bull, 1959) the effectiveness of which has already been proved. Such measures though very effective in the technically advanced countries of the world, cannot however be applied in the developing countries because of the high cost and lack of expert staff required for these measures. A less expensive and fairly effective method of treatment is to control the severity of spasms by conservative measures, limit the disease by neutralizing the circulating toxins and using antibiotics to restrict their further production. To achieve this objective, different therapeutic regimens have been tried by several workers but the results are not very encouraging.

In order to assess the efficacy of various regimens a prospective study is being carried out in the Special Baby Care Unit of Khyber Hospital, Peshawar. The objective is to find a line of treatment simple enough to be followed in circumstances like ours.

Material and Methods

The Special Baby Care Unit of Khyber Hospital, Peshawar, acts as a referral centre for the whole Province of North-West Frontier and adjacent areas of Afghanistan. During the period from 15th December, 1979 to 15th December, 1980, one hundred cases of Neonatal Tetanus were admitted to this Unit. This report is based on their study. The diagnosis in all cases-was made on clinical features. The severity of the disease was assessed by a system of scoring (Daud et al., 1980). Only those babies were selected randomly to be treated by four main regimens who, according to our grading, were placed in grade 3 or 4.

Before commencing a specific therapy, the consent of parents was obtained and all the babies were isolated in a separate dark room. All the babies were given regular sedation with phenobarbitone in a dose of 10 mg per kg per 24 hours, and Diazepam in dose of 0.5 mg/kg per dose was administered intravenous for the rapid control of spasms and as a continuous infusion for prophylaxis of spasms. In addition, all the babies were given Ampicillin in a dose of 150 mg/kg/24 hours intravenous 6 hourly

and Kanamycin in a dose of 15 mg/kg/24 hours intravenous 12 hourly. The nutrition of these babies was maintained by intravenous therapy in the initial stages, supported partially by milk feed after the period of intense spasms when the stiffness of the babies had decreased considerably. When the babies started tolerating milk feed orally, the intra-venous route was reserved only for medication.

Results

A total of 100 babies of Neonatal Tetanus were admitted to the unit from 15th December, 1979 to 15th December, 1980. All the babies were home delivered, after normal full-term pregnancies, their deliveries were conducted by untrained midwives or Dais and the cord was severed by a variety of unsterilized instruments. The history of maternal immunization against tetanus was negative in all cases. The umbilicus in 49 cases was found covered by home-made ointments, while in 54 cases, frank umbilical sepsis was observed. The mean age of developing signs and symptoms of tetanus was 5.2 days and that of reporting to the hospital 8.4 days.

The outcome in different groups is shown in the following table.

Table : Results of Different Therapeutic Regimens

No.	Regimen	No of cases	CURED		DIED	
			No.	%	No.	%
I	ATS 15000 Us. S/C+1500 Us. I/V	30	12	40.00	18	60.00
II	ATS 1500 Us I/V	30	15	50.00	15	50.00
III	No ATS	18	8	44.44	10	55.56
IV	ATS 15000 Us I/V+Pyridoxine 100 mg/24 hrs I/V	22	17	77.27	5	22.73
		100	52	52%	48	48%

The first group comprising of 30 babies was given 15000 units of Anti Tetanus Serum sub-cutaneously around the umbilicus and 1500 units intravenously.

The second group comprising of 30 babies was given 1500 units of Anti Tetanus Serum through the intravenous route alone.

In the third group of 18 babies no Anti Tetanus Serum was given.

The fourth group of 22 babies was treated with pyridoxine 100 mg/24 hours intravenously by continuous infusion in addition to Anti-Tetanus Serum given in a dose of 1500 units intravenously.

A case, was considered cured when it fulfilled the following criteria:

- Absence of spasms from 48 hours after stopping sedation;
- Resumption of normal oral feeds by the baby.

Discussion

The high incidence of Neonatal Tetanus in the developing countries is a major cause of neonatal mortality (Bytchenko, 1966). Although the incidence of the disease in Pakistan is very high, it has not yet been accurately estimated. This high incidence is apparently due to factors like lack of antenatal care, poor midwifery services and the use of a variety of contaminated instruments used to sever the

cord at birth. Materials like cow dung and dirty home-made ointments were used in some areas to cover the umbilicus.

The nidus of infection in Tetanus Neonatorum was believed to be the umbilicus. Although we could not grow *C. Tetani* from umbilical swabs but the stump was dirty and inflamed in all cases.

Majority (94.6%) of the cases were either Grade III or IV (except 3 in Grade II and 2 in Grade I were not included in the study), hence they did not present diagnostic difficulties. The reason for the late referral of these cases is probably the fact that the initial symptoms of feed refusal, low intake and regurgitation is present in most other neonatal disorders and hence were not given due consideration by parents and family physicians.

Existing evidence suggests home delivery to be a significant risk factor (Pinheiro, 1964). Our study confirms this fact as all cases were home delivered.

Yalez and Hasanglu (1978) from the Department of Paediatrics, University of Ankara studied 229 cases of Neonatal Tetanus in 18 years (1959-76). The major differences in the groups treated was the route of administration of Anti-Tetanus Serum. The over all mortality was 66%. The administration of Anti-Tetanus Serum intramuscular, intramuscular and intra-venous, and intravenous alone lowered the mortality rate to 30% and intrathecal+intra-muscular to 46%. Although we did not give Anti-Tetanus Serum by the intrathecal route, we found no significant differences in the groups treated by Anti-Tetanus Serum administered through the various parenteral routes. Desai (1978) treated 619 cases of Tetanus over a period of 20 years. Two hundred and nineteen cases-were treated without Anti-Tetanus Serum and 400 cases were administered Anti-Tetanus Serum; 27.5% of total cases comprised of Neonatal Tetanus. In group A (No Anti-Tetanus Serum) the mortality was 53% as compared to 58% in group B (with Anti-Tetanus Serum). He concluded that better nursing care, effective control of spasms and proper nutrition are more effective in Neonatal Tetanus, than the use of Anti-Tetanus Serum. We treated 18 cases of Neonatal Tetanus without Anti-Tetanus Serum and the mortality was 55.56%.

In this study, the mortality in the group treated by intravenous Anti-Tetanus Serum was significantly lower than those treated by intravenous plus intramuscular, or without Anti-Tetanus Serum, hence we feel that Anti-Tetanus Serum administered intravenously has a role in neutralizing the circulating toxins and curtailing the course of disease.

Mc Cracken et al (1979) found in a double blind study that 500 units of Tetanus Immune Globin was as efficacious as 10,000 units of Equine Antitoxin, and that the risk of adverse reactions with Tetanus Immune Globin was less as compared to the use of Equine Antitoxin. But the high cost of Tetanus Immune Globin renders its use quite impracticable in our circumstances and we do not have any experience of having used it.

Fourty eight percent of patients treated with ampicillin and Kanamycin along with other conservative measure died in this series.

Godel (1980) from University of Alberta, Canada, added pyridoxine (a co-enzyme in the production of Gamma Amino Butyric Acid) in a dose of 100 mg/24 hours intravenous to conventional therapy in 20 infants and omitted the same in 4 controls (Godel, 1980). The rationale being that Gamma Amino Butyric Acid is believed to be a presynaptic inhibitor in the spinal cord and an inhibitory mediator in the brain of mammals. Pyridoxine is a co-enzyme for the conversion of glutamic acid to Gamma Amino Butyric Acid. It is also a co-factor for transaminases which convert different amino acids to glutamic acid. So the amount of Gamma Amino Butyric Acid varies with the amount of pyridoxine available for the above mentioned reactions. In this study, the over all mortality of 15% in the treatment group was significantly lower than 75% in the control group.

The mortality in Pyridoxine treated group (Regimen 4) was 22.7% as compared to the over all mortality of 55.13% in the remaining 3 regimens. Pyridoxine has so far appeared to decrease the mortality, severity of spasms and sedation needed in cases of Neonatal Tetanus.

All the babies were fed through nasogastric tube after the initial period of intense spasms. Most of them remained constipated as long as they had spasms but once the intensity was controlled they regained

normal bowel habits.

The main cause of death in this series was aspiration pneumonia. The same has been reported by Salimpur (1978) from Tehran who performed autopsies on 54 babies to confirm this. However, three babies in our series died of pulmonary haemorrhage, and 8 babies developed gastroenteritis (Pathogenic E. Coli were isolated from their stools), who finally succumbed to severe fluid and electrolyte imbalance. Ten babies developed septicaemia; blood cultures in these cases revealed pathogenic strains of E. Coli. None of the babies with septicaemia survived. Twenty babies developed jaundice, the cause in half was septicaemia and cholestasis.

We intend to follow these babies for a period of 5 years for evidence of any residual neurological damage. The survivors followed so far when examined at the ages of 3, 6, 9 and 12 months were found to be developmentally normal. Umbilical herniae were found in 80% of these babies, developing in the acute stage probably due to infection resulting in damage of the umbilical ring and by increase in the intra abdominal pressure during spasms.

It is concluded that the modern methods like artificial respirators, neuromuscular blocking agents, aseptic delivery techniques and ritualistic maternal immunization, though of extreme importance in the treatment of Neonatal Tetanus, are not practised in this country, therefore, the salvation lies in selecting a conservative regimen of treatment. The inclusion of pyridoxine in the treatment of Neonatal Tetanus has given promising results and its efficacy is being evaluated.

References

1. Adams, J.M., Kenny, J.D. and Rudolph, A.J. (1979) Modern management of tetanus neonatorum. *Pediatrics*, 64:472.
2. Bytchenko, B. (1966) Geographical distribution of tetanus in the world, 1951-60. *Bult. WHO.*, 34:71.
3. Daud, S., Tufail, M. and Ashfaq, A. Proceedings of Vth All Pakistan Biennial Paed. Conf. and Int. Symp. on Child Health in Developing Countries, 1980.
4. Desai, A.B. Treatment of tetanus without ATS. Proceedings XV International Congress of Paediatrics, 1978.
5. Godel, J.C. Neonatal tetanus - trial of pyridoxine therapy. Proceedings XV Int. Cong. Paed. Barcellona, 1980.
6. Mc Cracken, G.H., Dowell, D.L. and Marshall, F.N. (1979) Double blind trial of equine antitoxin and human immune globin in tetanus neonatorum. *Lancet*, 1:1146. 1979.
7. Nourmand, A., Ghavami, A., Ziai, M. and Tahernia, C. (1970) Tetanus neonatorum in Iran; notes on etiology, manifestation and therapy, *Clin. Paediatr.*, 9:609.
8. Pinheiro, D. (1964) Tetanus of the newborn infant. A review of 238 cases treated in the hospital das clinicas, Sao Paulo, Brazil, *Paediatrics*, 34:32.
9. Salimpur, R. Tetanus neonatorum in Tehran. Proceedings XV Int. Cong. Paediatrics, 1978.
10. Smythe, P.M. and Bull, A. (1959) Treatment of tetanus neonatorum with intermittent positive pressure respiration. *Br. Med. J.*, 2:107.
11. Yalez, K. and Hasanglu, E. (Turkey) Prognosis of tetanus neonatorum according to various methods of treatment. Proceedings XV Int. Cong. of Paediatrics, 1978.