MATERIAL AND METHODS

The present study includes tetanus cases admitted between January 1986 and December 1988, at M.J.E. Medical College Hospital, Jhansi (U.P.). 285 patients of tetanus of all age groups were admitted out of which 245 cases were studied and analysed (40 patients absconded or left against medical advice).

history

A detailed history of the patients, was taken with special reference to age, sex, address, religion, occupation, socio-economic status, customs and habits. The complaints were noted with special reference to the portal of entry of infection, duration of symptoms and their severity. The incubation period and period of onset could be thus calculated. Besides other complaints the presence or absence of the following symptoms was stressed upon. These included lockjaw/insability to suck (neonates) excessive crying (neonates), dysphagia, fever, posture (opisthotonous pleurothotonos, supine, flexed) and convulsions.

Any past history of infection or prophylactic immunization against tetanus, history of delivery,
turn, injury of operation was noted besides patient's complaints.

In neonates, the place of delivery, the person who conducted the delivery (trained or untrained), instrument used for cutting the cord (sterile or unsterile) and any application over the cord was noted. Any history of antenatal immunization in the mother was noted.

Physical examination

This consisted of a general and local examination. The general examination included the general condition, consciousness, pulse, temperature, blood pressure, respiratory rate, hydration, the presence or absence of cyanosis, oedema, jaundice, lymphadenopathy, constipation, retention of urine and any other systemic problem relating to respiratory, cardiovascular, abdominal, nervous or other systems.

On local examination the following were noted—temperature, lock jaw, dysphagia, risus sardonicus, inability to suck, excessive crying, body and limb rigidity, posture, opisthotonus, pleurothotonous, neck rigidity and convulsions.
In neonates the following points were stressed upon—excessive cry, inability to suck, posture, convulsions, rigidity, premature, umbilical sepsis, jaundice and kernicterus. The patients were divided in 3 groups according to age.

(1) *Tetanus neonatorum*

This included all neonates from birth to the age of 1 month.

(2) *Childhood tetanus*

This included all patients from infancy (above 1 month of age) to the age of 12 years in childhood.

(3) *Adult tetanus*

All cases above the age of 12 years were put in this group.

Patients were also classified on the basis of the severity of disease based on Katel and Joeg's (1959) criteria for the same.

Criteria (1) Presence of lock jaw/inability to suck.

" (2) Presence of spasms

" (3) Incubation period of 7 days or less

" (4) Period of onset - 48 hours or less.

" (5) Fever on admission i.e. axillary temperature of 99°F or Rectal temperature of 100°F on admission or within 24 hours of admission.
The cases having one of the five criteria were termed as grade I, the cases having only two of the five criteria as grade II, cases having all of the five criteria as grade V and so on.

In some cases the incubation period could not be determined as no obvious cause was present. Patients with a prolonged history of ear discharge also presented the same problem. Incubation period could not be ascertained in such patients.

**Therapy**

The patients were admitted and nursed in the tetanus ward.

All the patients were put on the following regime -
(1) Local measures for elimination of toxin source.
(2) Administration of intrathecal anti-tetanus human immunoglobulin to neutralize unfixed toxins.
(3) Control of muscle spasms and convulsions.
(4) Maintenance of airway and ventilation.
(5) Symptomatic treatment and nursing care.
(6) Immunization (active).

Meticulous cleaning of wounds was done with antiseptic solutions. Wound debridement was done
where necessary. Hydrogen peroxide was used for grossly contaminated or necrotic wounds. Sepsis was taken care of and pus was let out by incision and drainage in case of suppuration. Ear infections were taken care of with proper cleansing, dry mopping and antibiotics. Dressings were changed as and when necessary. Oral hygiene was cared for. In neonates the umbilical cord was cleaned with rectified spirit and 1% G.V. paint was applied. Antibiotics were also used locally as necessary in the form of ointments or powder.

Anticonvulsants and sedatives were used for the control of muscle spasms and convulsions. Diazepam was used for sedation, control of spasms and rigidity, in doses of 0.3 mg to 1.0 mg per kg. of body weight in divided doses, according to the severity of rigidity and spasms. In adults 2 mg to 20 mg of the drug was given eight hourly or repeated even earlier at shorter intervals as required.

Where diazepam alone was not effective in controlling spasms promethazine was added in a dose of 50 - 250 mg/day as required alongwith other drugs.

Methocarbamol (Centrally acting muscle relaxant) was given alongwith diazepam in a dose of
100 - 200 mg/kg of body weight per day in divided doses.

Diazepam, phenargan and methocarbamol were used by the intravenous route, either by continuous infusion (slow) in intravenous drip solution, or intravenous as such if frequent doses were necessary. When the patients condition improved and if the patients could swallow, these drugs were given orally as tablets. The dose of sedatives and muscle relaxants was gradually tapered according to regression of rigidity, convulsions and other symptoms.

Adequate ventilation and patency of airway was taken care of, with frequent suction and cleaning of the oral and nasal passage. Intubation and tracheostomy were done when necessary. However tracheostomy did not prove to be of much benefit. I.P.P.V. was not used. Patients with dysphagia and frequent, repeated convulsions, were kept on intravenous fluids for maintenance and nutrition. Ryles tube feeding was started on regression of spasms. When lock jaw and dysphagia had decreased, to the extent that the patient had no regurgitation and choking on swallowing and if he/she could open the mouth sufficiently, oral feeding was started.
Care of the back was done to prevent bed sores by frequent change of posture, cleaning with spirit and antiseptics and application of talcum powder (medicated). Bladder care was done. Retention of urine was avoided by early catheterization. Urine cultures and wound swab cultures were done and appropriate antibiotics instituted based on sensitivity tests.

Bowel care was taken care of by avoiding constipation. When necessary, glycerine suppositories, aperients and laxatives or enemata were used.

Initially all patients were administered crystalline penicillin in a dose of 50,000 to 1 lakh units per kg of body weight per day in 4 to 6 divided doses parenterally. Patients sensitive to penicillin were administered ampicillin, chloramphenicol or any other suitable drug.

In patients with super-added chest infection or gram negative sepsis gentamicin injection was given parenterally in dose of 2 – 7.5 mg/kg of body weight in twice daily or thrice daily divided doses. Metronidazole (oral & i.v.) was used in some patients.

**Therapy with intrathecal T.I.G.**

All patients were given intrathecal human
antitetanus immunoglobulin (A.I.G.) in doses of 250 I.U. to 3500 I.U. Some patients were given T.I.G. intramuscularly as intrathecal administration failed in such patients. No other patient was given intramuscular T.I.G. Along with this the patient was given standard supportive therapy as already mentioned.

Owing to its expensiveness higher doses of A.I.G. could only be given to those patients who could afford it.

**Procedure**

Lumbar puncture was performed in the interspace between L3-L4 or L2-L3 vertebrae under all aseptic and antiseptic precautions and after mild sedation and relaxation of the patient with diazepam and methocarbamol. In case of the freeze dried powder, form of T.I.G. it was freshly prepared by the addition of diluent provided along with it. After introducing the lumbar puncture needle in the subarachnoid space 8 to 10 drops of cerebrospinal fluid was allowed to drain out slowly. T.I.G. was then slowly instilled intrathecally through the lumbar puncture needle.

**Immunization**

All patients were immunized with tetanus toxoid 0.5 ml, intramuscularly on admission. They were asked to report at 6 weeks and 6 months intervals for further two doses of immunization.