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For General Practitioners :

TETANUS

Tetanus in infants and children is associated with significant mortality. It is unfortunate that a completely preventable disease should take a big toll of lives. It is caused by *Clostridium tetani*, which is an anaerobic, spore-bearing Gram-positive bacillus. It is widely distributed in soil, being present in the faeces of several animals and humans. The bacilli gain entry into the body through abraded skin which is contaminated with dust. Since exclusion of air promotes its growth, the bacilli thrive in puncture wounds, those with lot of laceration or with a foreign body. It may follow application of 'cow dung' to the site of smallpox vaccination, or by inoculation into the umbilical cord of the newborn when it becomes necrotic. Suppurative otitis media may provide an entry for the bacteria.

Clinical Features

After an incubation period of a few days to 6 weeks, the first symptom may appear. Often, there is a sense of tense muscles round about the site of entry or generalised vague aches, irritability and restlessness. In the following 24-48 hours, tightness of jaw, stiff neck, increased tone in the limbs, a positive Kernig's sign and difficulty in swallowing develop. The facial expression may show anxiety, or a characteristic *facies sardonicus*. Recurrent spasms and convulsions may occur. Temperature is variable. In severe cases, the back is also affected producing opisthotonus. Spasms may be precipitated by all types of stimuli—visual, tactile, auditory, etc.

In neonatal tetanus, there may be nonspecific symptoms to begin with. Failure to take feeds, irritability and a bulging fontanelle may be the first indications of something being wrong with the baby. Trismus supervenes soon after and produces inability to suck. The stiffness of the jaw is never extreme in the newborn. In fact, during spasms, there may actually be a dropping of the lower jaw to some extent, and *facies sardonicus* is comparatively less often seen.

In severe cases, the spasms come very frequently producing extreme exhaustion. Inability to take fluids and food causes dehydration, emaciation and even peripheral circulatory failure. The respiratory muscles may be affected, causing respiratory failure. Laryngeal spasm is the most dreaded complication, since it would choke the patient to death. Superadded infections pose further problems.

Investigations are of little use. There may be a slight leucocytosis. C.S.F. examination is not advisable if the clinical picture is fairly suggestive of the disease. Anaerobic culture of the

possible site of entry should be done and may yield *Cl. tetani* in a small proportion of cases.

Management

It is essential to hospitalize all cases of tetanus, in an isolation ward with full precautions regarding spread to other patients. Despite recent controversy on the utility of antitetanus serum, it is safer and probably beneficial to give 10,000 to 50,000 units of antitoxin. It serves to neutralize the circulating toxin present or being liberated. There is no measure which can act against the toxin already fixed to the tissues.

Surgical de'bridement of the wound, including ample excision, cleaning, and local application of antiseptic agents is essential. Immediate institution of antibiotic therapy with penicillin should be done. It should be given intramuscularly or intravenously (if an intravenous drip is set up for some other purpose). In severe cases, it is desirable to add erythromycin as well in order to cover penicillin-resistant *Cl. tetani.* Some workers prefer to use tetracyclines instead of erythromycin, but since the former is bacteriostatic, it would not be logical to combine it with a bactericidal drug like penicillin.

Adequate sedation is the sheet anchor of supportive therapy. Phenobarbitone (4-8 mg / kg. / day in three divided doses) and chlorpromazine (Largactil 3-4 mg / kg. / day in three divided doses) should be alternated with each other and given every 4 hours. The doses of both, especially that of chlorpromazine can be profitably and safely increased to twice, if the spasms are uncontrolled. In severer cases, paraldehyde per rectum, can be used in addition. In well-equipped centres, complete muscular relaxation with curare-like agents and intermittent positive pressure respiration may help some patients.

A careful watch should be maintained on rate of respiration, temperature, cyanosis, heart rate, and patency of airways. Frequent aspiration of secretions in the throat should be done. In cases with episodes of laryngeal spasm, tracheostomy should be carried out electively, to reduce the dead space and ensure adequate freedom from secretions. Oxygen should be readily available by the bedside.

The child should be nursed in a dark quiet room. Feeding should be done by a gastric tube, passed initially after a dose of paraldehyde. Rarely, intravenous fluids may be required.

Prognosis

Although in clinical medicine, it is difficult to prognosticate with arithmetical accuracy, certain symptoms and signs in tetanus indicate a severe disease and, therefore, a worse prognosis. These are, an incubation period of less than 7 days, period of onset (interval between the first symptom and the first spasm) less than 48 hours, lock-jaw, spasms, and temperature 100°F. The age of the child also matters, since in neonatal tetanus, the mortality rate is extremely high, being as much as 85-90 per cent even in the best of centres.

Prevention

The prevention of tetanus by universal active immunization should be the aim of every practising physician

—it is an ideal which is not impossible to achieve. Every child and adult should have a primary course of immunization with tetanus toxoid followed by booster injection every 5 years. This single measure can eliminate tetanus from the community. It is best advocated and practised in child welfare clinics and by family physicians and practitioners.

In a non-immune individual, soon after an injury suspected to be contaminated, parenteral penicillin should be started and a thorough de'bridement of the wound done. The role of antitetanus serum in prophylaxis is being debated and questioned. However, if the wound is lacerated, with a foreign body or a deep puncture, it would be desirable to give 2500-3000 units of serum intramuscularly after doing a skin and conjunctival sensitivity test, employing 0·1 ml. of 1 : 100 diluted serum. Of course, it should be remembered that a negative sensitivity reaction does not preclude an anaphylactic response. Countermeasures like adrenaline and hydrocortisone should be readily available. The incidence of immediate and delayed reactions to antitentanus serum is high enough to stimulate all doctors to encourage active immunization of all individuals.