Original Article

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Treatment of Tetanus-An Open Study to Compare the Efficacy of Penicillin and I.V. Metronidazole

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Abstract

Introduction: During the past decade metronidazole has emerged as highly effective agent, both for treating and preventing a wide variety of anerobic bacterial disease. It is a stable and readily available drug that rapidly achieves theraputic concentration in virtually all body tissue and fluids after rectal, oral and intravenous administration. *Methodology*: This work essentially consists of management of tetanus cases admitted to Government General Hospital and compare the results of cases treeated with I.V. Metronidazole and pencillin *Results*: In penicillin group 90% deaths occurred whereas in Metronidazole group 47% deaths occurred among severe cases. In penicillin group 30% deaths occurred whereas in Metronidazole group 28% deaths occurred among mild cases. *Conclusion*: Duration of stay in hospital in metronidazole group is shorter compared to penicillin group.

Keywords: Tetanus; Metronidazole; Penicillin.

Introduction

The word Tetanus has its origin in the greek Teino which means stretch. It is known by various names 'Hause° (Nigeria), Dhanurvata (India), Gazaz (Arab-countries), Po-Shion-Tong (China) 'Malde Arco' (Mexico) Disease of seventh day (Algeria).

The casual organism clostridium Tetani is a Gram positive rod which forms a terminal spore giving a drum-stick appearance. It is an anerobe, the growth requirements depends on other organisms in wound and on foreign body or dead tissue. When it grows it forms a very powerful toxin 'Exotoxin'. The toxin travels along nerves to the central-nervous system where it has dual action: It interferes with acetylcholine / Supportive care until the neurotoxin fixed to nervous tissue gets eliminated and to prevent the absorption of further toxin by giving antitoxin [1]. Some of consider that once tetanus toxin is fixed in nerve cells antitoxin cannot combines with it or dislodge it. It can't have any effect on symptoms already caused by it. Its only effect can be to neutralize toxin still being produced and absorbed. But in tetanus cases, toxin cannot be demonstrated in blood hence usefulness of antitoxin is controversial. In addition to this antibiotics, muscle relaxants' and sedation are invariably given for eradication of organism and spasm of muscle [2].

During the past decade metronidazole has emerged as highly effective agent, both for treating and preventing a wide variety of anaerobic bacterial disease. It is a stable and readily available drug that rapidly achieves therapeutic concentration in virtually all body tissue and fluids after rectal, oral and intravenous administration. It is compatible with all other antimicrobial agents and rapidly bactericidal for all anaerobic microorganism and conventional courses of drug do not interfere with normal bacterial floras and do not induce superinfection. Resistance to metronidazole is rare [3,4].

The aim of the present study is to compare the efficacy of pencilline and I.V. Metronidazole, in the management of Tetanus

Methodology

This work essentially consists of management of tetanus cases admitted to Government General Hospital and compare the results of cases treeated with I.V. Metronidazole and pencillin.

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Then a case of tetanus was admitted to Isolation ward of Government General Hospital, a detailed clinical history was taken and clinical examinations was performed, these findings were entered in cyclostyled proforma. Necessary relevant investigations were performed at the time of admission. The Diagnosis of the disease was always essentially clinical.

Mild Rigidity

Range of movements normal but movements not free and spontaneous movements present.

Moderate Rigidity

Spontaneous movement minimum.

Severe Rigidity

Spontaneous movement absent.

Most Severe Rigidity

Persistent opisthotonus.

The trismus (Lock Jaw) was also graded into mild, moderate and severe.

Mild Trismus

The interdental fissure would admit two fingers.

Moderate Trismus

The Interdental fissure would admit only one finger.

Severe Trismus

The patient showed inability to open the mouth.

The body position between the reflex spasms was noted under the following headings:

1. Opisthotonus.
2. Supine and both limb extended
3. Supine and only the upper limb kept flexed at ease.
4. Supine and all the joints kept flexed at ease.

The patient was graded to be suffering from mild, moderate or severe tetanus according to criteria given by Smith A.C. which are as follows:

Mild

The patient shows only some local stiffness or minimal generalized stiffness without opisthotonus, dysphagia or generalized spasm. The period of onset is more than 48 hours.

Moderat

The moderate cases show generalized hypertonicity with dysphagia but without severe generalized reflux spasm and without anoxia. These cases show occasional increase hypertonicity which causes transitory opisthotonus or even frequent reflex spasms which are not violent or cyanotic. They are controlable with relatively conservative measures. The period of onset is less than 48 hours.

Severe

The patient shows multiple or severe generalized. spasms with dysphagia severe opisthotonus and anoxia during spasm.

The patients wereadmitted in four surgical units (A,B,C and DS.) Surgical 'C' unit cases were treated with I.V. metronidazole and other unit cases were given penicillin. The rest of the management was simila.

As soon as patient was admitted he was given one cc of absorbed tetanus toxoid intramuscularly.

The maintainance of nutrition, hydration and electrolyte balance was done orally or whenever necessary by nasogastric feeding; when the patient was havinc severe spasm he was maintained on I.V. fluids and I.V. route was used for Injection of relaxant drugs to combat severe spasm. The surgical 'C' unit cases treated with. I.V. Metronidazole and other units cases were treated with pencilin. In the surcical 'C' unit diazepam was cteds-the sole muscle relaxant. Multivitamins were added to the I.V. drip. Paracetamol in the syrup form or as an injection was used when required.

Whenever wound was found it was debrided, cleaned with Hydrogen peroxide and dressed after applying local antibiotic ointment. The dressing was changed daily and necrotic tissue if found was debrided.

If the patient is found to be constipated and did not have very frequent reflex spasms then the bowels were evacuated with soap water enema or "Dulcolax" or Glycerine suppository.

Tracheostomy was not done routinely and no feeding gastrostomy was done for any patient. The follow up of cases was extremely difficult as most of the patients did not come for routine follow up as requested.

Results

Table 1: Distribution based on period of onset

Duration	Pencillin group			Metronidazole group		
	Total	Deaths	Percentage	Total	Deaths	Percentage
Less than 48 hours	20	12	60	18	09	50
More than 48 hours	30	12	40	32	09	28

Table 2: Distribution based on severity

Severity	Pencillin group			Metronidazole group		
	Total	Deaths	Percentage	Total	Deaths	Percentage
Mild	30	09	30	25	07	28
Moderate	10	06	60	10	04	04
Severe	10	09	90	15	07	47

Table 3: Duration of stay of survivors

Duration	Pencillin Group	Metronidazole Group
1 – 10 days	05	07
11 – 20 days	20	21
21 – 30 days	15	17
31 – 40 days	10	05

In pencillin group 60% deaths occurred whereas in Metronidazole group 50% deaths occurred among cases of period of onset less than 48 hours

In pencillin group 40% deaths occurred whereas in Metronidazole group 28% deaths occurred among cases of period of onset more than 48 hours

In pencillin group 90% deaths occurred whereas in Metronidazole group 47% deaths occurred among severe cases

In pencillin group 30% deaths occurred whereas in Metronidazole group 28% deaths occurred among mild cases

Highest number of survivors in pencillin group stayed for 11–20 days (n=20) followed by 21– 30 days (n=15)

Highest number of survivors in Metronidazole group stayed for 11 – 20 days (n=21) followed by 21– 30 days (n=17)

Discussion

Trauma has been the commonest source of infection, particularly to the lower limb because of most of the rural people wall bare tested and thus more prone for trauma. Next in incidence is the unknown factor (idiopathic) where the source was not found. As most of our patients are poor, live the very unhygienic life and are exposed to many cuts and scratches every day which gets contaminated and it is thus difficult to know which injury really caused the disease.

Clinical Features

All cases had trismus of varying grade and dysphagia. Mortality was high in cases of severe tetanus. Such patients had repeated attacks of convulsions. In the patients treated with I.V. metronidazole, the mortality in severe grade has been reduced to 50% as compaired to pencillin group.

The prognosis in tetanus has been described to depend upon many factors such as age, sex, general physique, incubation period, period of onset, severity of disease, fever and nature of complications, portal of entry, nature and site of injury.

Age

The mortality is high in cases below five years and those above 50 years.

Sex

Our observation has shown a slicht by higher mortality in Females. Male mortality was 28% and Female mortality was 37.9%. This may be attributed to less power of resistance in females.

General Physique

It was observed that healthy well built individual with stood the stress better than others.

Portal of Entry

As mentioned previously the mortality has been more in tetanus following injury to lower limb and

probable explanation is that the villagers are working bare footed.

Incubation Period

When the incubation period was less than 8 days the mortality was 59.09% and when it was more than 8 days the mortality was 37.17%. 4hen the incubation period is longer the mortality rate is less The mortality in metronidazole group with incubation period less than 8 days is 50% and incubation period more than 8 days is 28.9%, where as in pencillin group it is 75% and 45% respectively.

Period of Onset

This is a very helpful prognostic index. It is a period between the first symptom and first generalized spasm. If the period is less than 48 hours. The mortality is more. When this period was less than 48 hours the mortality is 55.26% and with period more than 48 hours, the mortality is 33.88%. In I.V. Metronidazole treated cases when the period of onset was less than 48 hours, the mortality is 50% as compared with pencillin group which is 60% when this period was more than 48 hours, the Mortality in pencillin group is 40% as compared with I.V. Metronidazole group which had mortality 12.81%.

Severity of Index

As mentioned earlier the severity of symptom depend upon the severity of spasm and mortality is increased with severity of spasm. In our observation, in mild cases the percentage of mortality is 29.09% and in moderate cases the mortality 55% and in sever cases the mortality is 64%. In mild, moderate and severe cases in pencillin group Mortality is 30%, 60% and 90% as compared to metronidazole group which has mortality of 28%, 40% and 46.68% respectively.

Treatment of Tetanus: Comparison of The Efficacy of Pencilin with That of I.v. Metronidazole [5,6]. In one group, fifty Tetanus cases were given I.V. Metronidazole and the other group of fifty cases were treated with pencillin. A detailed History and clinical examination findings were recorded. Except for the above difference, the management of tetanus in all the surgical units was same.

All patients received' only diazepam for sedation and relaxation. The dose was according to the body weight and severity of the disease. An average adult does was 40-120 mg / day (or an average dose for mild, moderate and severe cases was 2.4, 4.3 and 9.3 mg / kg body, weight / 24 hours).

As we know efficacy of antibiotics depends not only on sensitivity of infecting strain to the drug but also on concentration of drug attained and sustained at the site of infection. Because the infected wound in tetanus is essentially anerobic the target site is unlikely to receive therapeutic concentration of many drugs including pencillin since they depend on adequate perfusion for delivery to tissue. Moreover the presence of concomitant infecting or colonising B-lactamese producing organisms such as staphylococci and E. Coll would ensure that what little pencillin does find its way into the infected zone is promptly inactivated by the above enzyme activity. Whereas metronidazole is rapidly bactericidal both in vivo and vitro against the whole spectrum of enerobic organisms and that its pharmacokinetic attributes ensure its distribution effectively in therapeutic concentration even to anaerobic tissue. In the present study all relevant comparison is made between the pencillin and metronidazole groups of patients regarding mortality. In I.V. metronidazole group it is 36% as compared to 52% in pencillin- group . In severity index groups, the metronidazole group had lower mortality than pencillin Group in identication group. The duration of stay in Hospital in metronidazole group is lower than the pencillin group.

Conclusion

The mortality rate in I.V. metronidazole group was significantly, lower than the pencillin group.

References

1. Editorial.,J. of Indian Med. Assn. ATS as a prophylactic measure in cases of wounds resulting from Road or Industrial Accidents. 16 Sept. 1972; 59: 260.
2. Busutill et al. Traditional Treatment of 194 cases of Tetanus - Brit. Jr. Surg. Sept. 1997; 61(9): 731-4.
3. Faust R.A. et al., Tetanus, 2449 cases in 68 years at Charity Hospital, J.Trauma. 1976; 16: 704-12.
4. Laurence P.R., Evans D.G., JWG. Smith., Prevention of tetanus in wounded.Brit. Med.J. 1966; 1: 33-4.
5. Kerr J.H. et al., titonomic complications in a case of severe tetanus Am. J.Med. 1974; 57: 303-10.
6. Ibrahim Ahmadsyah agil salim., treatment of tetanus and open study to compare the efficacy of procain pppenecellin and metronidazae. Br. Med. J. 7th Sep. 1985; 291.