Treatment:—Rest in bed is of primary importance.

A completely Rice-free Diet during treatment, and convalescence.

Administration of Tincture Ephedra (20–30 minims) with x grs. of Calcium Lactate t.d.s., or preferably Osto-Calcium tabs. 2 t.d.s. An intestinal antiseptic, such as Salol, or Dimol.

Adexolin, or Radiostoleum may be given.

Prognosis:—Good as a rule. Relapses are most common if rice as an article of diet is resumed too early.

Readers of this article, should they desire more detailed information regarding this interesting disease, are strongly recommend to obtain a copy of the *Indian Medical Gazette*, vol. lxx, No. 9, for September 1935 from which, I am glad to acknowledge, I have taken many facts and figures.

CEREBRO-SPINAL FEVER

Paper read at the Student Nurses' Association Meeting at Conference

By Miss DuBois, of the Thomason Hospital, Agra.

Definition—

A specific disease due to infection of the body by the meningococcus occurring both in epidemics and in sporadic form, and most often manifesting itself as an acute meningitis tending to involve the whole cerebro-spinal axis. It most often occurs in an epidemic form. The epidemics of this disease are marked by several features peculiar to the disease offering a striking contrast with other epidemic cases. Among these curious features may be mentioned the erratic nature of the outbreaks, the inability to trace the connection between one epidemic and another, the relative or even total escape of certain localities close to others in which the disease was prevalent and the small proportion of persons affected in any one district.

Aetiology—

Epidemic cerebro-spinal miningitis is a disease of winter and spring. This seasonal incident is a very important feature of the disease. It compares markedly with the seasonal incidence of epidemics of Poliomyelitis which are at their height in the summer months. Naso-pharyngeal catarrh is a common accompaniment of the disease. The question whethhr this disease is contagious or not has been a matter of great discussion. As a matter of fact it is contagious, but the degree to which it is, is very slight. The following are certain proofs which show that it is contagious.

(*a*) The occasional transmission of the disease to the doctors and nurses. (*b*) The occurrence of the disease in one family in the same house. (*c*) The importation of the disease into a new locality or a country.

Meningococci—

It is a gram negative diplococcus. It resembles in its staining reaction with two other pathogenic diplococci. The micrococcus catarrhalis and gonococcus. The fertilising ground of the meningococcus germ both in the acute cases of the disease and in the carriers, being the upper part of the naso-pharynx and the posterior nares.

Signs, Symptoms and the Course of the Disease

According to its clinical manifestations in its various forms it has been divided into four types:—

1. Ordinary or acute type.
2. Sub-acute type.
3. Fulminating type or malignant type.
4. A mild type.

There is a fifth type of the disease which is most common in infants and with children up to 12 years of age and is known as ' Post-basic Meningitis of Infants '. The symptoms of cerebro-spinal meningitis are present in all the different types shown in greater or lesser degree. As in all other infectious cases it has an incubation period which varies from 4 to 6 days.

The onset is sudden with fever and headache, general malaise and vomiting. The temperature usually rises to about 102° to 104°.

Delirium is frequently present from the commencement. In addition to these cardinal signs the patient usually complains of pain in the neck, back and limbs, some degree of catarrh apparent. After 2 to 4 days some of these initial symptoms disappear and some persist and meningeal symptoms make their prominence. Temperature usually persists but it runs a very irregular and erratic nature. One can never say as to what type of temperature any particular patient has, or is going to have. Vomiting usually disappears after 3 to 5 days, very seldom it persists. Character of pulse usually irregular and slow as compared to the height of the temperature. Respiration in proportion to the pulse rate most often, later in the disease irregularity, and cheyne stokes type is seen. The muscles of the neck become stiff and the patient complains of agonising pain on any movement of the neck, and in the later stages the rigidity becomes so marked as to cause retraction of the head.

This sign is most marked in cases of post-basic meningitis of infants where the external occipital protuberance is found to touch the shoulder blades at the back. Due to the tautness of the muscles of the thighs the patient is unable to extend his knees when the thighs are flexed on the abdomen (Kernig's sign). During the first week in a considerable number of cases a rash appears on the trunk and extremities and sometimes round about the joints, these rashes are common in ' Western ' countries where the disease is known as ' spotted fever '.

Due to the rigidity of the muscles all over the body the patient becomes hypersensitive to touch, as the disease progresses all these signs and symptoms increase in their intensity. The patient passes sleepless nights for days and days together, the retraction of the head increases as a result of which the patient has difficulty in swallowing, quickly loses flesh and becomes thin and emaciated.

Prophylaxis Treatment—

The principles governing prophylaxis are those applicable to all other infectious diseases. Whenever possible the patient should be transferred to a hospital and preferably to an institution where the staff is accustomed to deal with infectious diseases, although it would appear that the healthy carrier is more responsible for the spread of the disease and to exercise all precautions against further contact with healthy persons. All those who are found to be carriers should be placed under quarantine and should be kept there till such time as a throat swab from the naso-pharynx is free from meningococci. Lavage of the naso-pharynx and gargle with some weak antiseptic solution should be done at least two or three times a day.

Curative—

It is a specific disease which has a specific line of treatment by means of Antisera which if adopted early, and well carried out is very successful in the majority of the cases. Nothing in the treatment of the patient should take precedence of the first serum administration.

During the epidemic which took place and still continues at Agra, several types of Anti-meningococcus serum were used and they are as follows :—

1. Bengal Chemical anti-meningococcus serum.

2. Bengal Immunity anti-meningococcus serum.
3. Behring's ,, ,,
4. Burroughs and Welcome ,, ,,
5. Park Davis's meningococcal anti-toxin.

In all the varieties mentioned above the mode of administration and dosage are more or less the same with slight variations, particularly in the last mentioned type of anti-toxin.

There are four routes by which this serum can be administered and they are

(*a*) Subcutaneous, (*b*) intra-thecally, (*c*) intramuscularly, (*d*) intravenously. The best is the combined administration through intravenous route and intra-thecal route.

Intra-thecal administration by lumbar puncture

Is the best method of administration of serum or anti-toxin. This is done by making the puncture between the 2nd and 3rd lumbar vertebra. In any case the puncture should not be done above the first lumbar vertebra as the spinal cord ends at the first lumbar vertebra.

The patient should be made to lie on his right side as close to the edge of the bed as possible, the knees and thighs flexed on the abdomen, the head must be bent forward to meet the knees. The idea of keeping the patient in this position is to make the inter-vertebral space as prominent as possible. The dose of serum to be injected intra-thecally should be equal to the amount of fluid withdrawn, or preferably slightly less. In the average number of cases in the adult, the usual amount of fluid withdrawn for the first few days varies between 20 to 30 c.c. or even 40 c.c. so the amount of serum injected should not exceed above 30 c.c.

Intravenously the amount injected is more or less the same as intra-thecally, but it has to be judged by the septicæmia and toxæmia that the patient is suffering from. After draining away the cerebro-spinal fluid the serum should be injected by means of a syringe, injected very slowly otherwise a rapidly injected serum may bring about a great amount of shock and damage to the vital centre, the medulla. The foot of the bed should be raised so as the serum may flow with gravity along the spinal canal. The injection should be given once every 24 hours but in severe cases it may have to be repeated within 12 hours. The serum or antitoxin treatment should be carried out till the fluid becomes clear and free from meningo-cocci. Injection of adrenalin ½ c.c. should always be given daily after the serum injection to prevent serum sickness and anaphylaxis.

Medicinal treatment—

Among the drugs usually prescribed and which is supposed to be a cerebro-spinal antiseptic is Hexamine, it should be prescribed in large doses in the mixture. Brandy and glucose—1 dr. in 1 oz. aqua 4 hourly.

Symptomatic treatment—

Fever—To be treated with diaphoretics, ice caps and cold sponging.

Delirium—Cold sponging (if due to a high temperature) Bromide and chloral, lastly Luminol gr.I doses, sometimes injections of hyoscine-hydrobromide grs. 1/200.

Vomiting may be checked with large doses of soda-bicarb solution and chips of ice to suck.

Bowels for constipation—calomel and saline may be prescribed or enema saponis on alternate days.

Pain—

Aspirin caffine may be given, if the pain is very severe and the patient passes sleepless nights morphia ¼ grs. may be given without hesitation. Fomentations to the back of the neck may be tried.

Arthritis—For this local treatment is necessary with hot fomentations and belladonna and glycerine paint applications, and joints covered with flannel bandages.

In cases of infusion inside the joint aspiration must be undertaken.

Diet—Milk or diluted milk feeds given 3 hourly, albumin water and glucose 5% solution add to the nutrition of the body. It must be borne in mind that fluid intake helps to combat the toxins in the system so much water and other named fluids assist greatly.

In children, especially when the patient is unable to swallow due to marked retraction, nasal feeding is given and rectal saline should be administered.

Later on when the patient progresses, feeding is most important, as the patient is emaciated and digestion enfeebled. Fruit juices combined with carbohydrates and proteins are gradually added to the diet.

Nursing—

From the nurses' point of view this is the most important. Receive the patient in a well ventilated but darkened and quiet room. These cases are rarely able to lie on their backs due to the painful contractions of the muscles, and invariably lie on their side with their legs drawn up.

Care of the mouth and back.—Paratitis is not uncommon when the case is admitted late into hospital. At least every 4 hours the nurse swabs carefully the inner aspect of the cheeks, gums and teeth using boro-glycerine, and if the patient is conscious, a solution of potassium permanganate with which to gargle.

Bedsores easily form, so changing the position and the washing of the back with hot water for stimulation and applying friction to encourage circulation is very necessary at frequent intervals. In very emaciated cases a water bed is useful against the formation of bed sores.

A great feature of nursing cerebro-spinal cases is the protection of ourselves and the community generally.

Over our uniforms, it is as well to wear an overall which can be removed when not in direct contact with the case. Muslin masks prevent the taking in of the patient's breath when bending over to perform nursing duties. Receiving swabs directly into a 'receiver' and burning in an open fire immediately does away with the risk of spread of the infection to a great degree.

Flies and dust carry the germ, for the former it is a practice to nurse the patient under a mosquito net, in the absence of fly proof doors which must be kept closed. The thorough scrubbing of our hands and immersing them in mercury lotion 1–5000, disinfection of linen and boiling before being sent to the laundry, and frequent (at least twice a day) gargling the throat with a mild antiseptic are amongst the last precautions we can take when nursing such cases.

CEREBRO SPINAL MENINGITIS, AGRA

	No. of cases	Deaths	Mortality
From March 1934 to Dec. 1934 ...	130	40	30·7%
,, Jan. 1935 to Dec. 1935 ...	242	96	39·6%
,, Jan. 1936 to Sep. 1936 ...	140	44	31·4%

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