THE USE OF ADRENALINE IN MEDICAL AND SURGICAL PRACTICE.

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THE service of adrenaline in medical and surgical practice is apt to be overlooked. And yet the information to be gained from its instillation in the eye is often of great value in estimating the integrity of the sympathetic system.

The supposed danger of producing glaucoma was founded on a series of five cases in which that disease was thought to be aggravated by the instillation of adrenaline.¹ Subsequent investigations have not confirmed the accusation. On the other hand, it has been advocated that adrenaline is not only harmless, but also that it is useful in glaucoma.

Grandclément in 1904² insisted that by the use of it glaucoma may be cured without operation if the disease has not advanced too far. Sydney Stephenson in 1908³ recorded that adrenaline had shown itself of service in the treatment of glaucoma.

O. Loewi in 1907 proposed that the mydriatic response to epinephrine should be used as a diagnostic sign in Basedow's disease and in pancreatic insufficiency.

Coope⁴ also supports the value of the response in the case of acute pancreatitis. According to Watanabe and Kato the sensitiveness appears to be somewhat increased in chronic nephritis.

Meltzer and Auer in 1903 pointed out that an increase of excitability to epinephrine occurred in degenerating structures of the ear vessels.

Lewandowsky in 1898 showed that the mydriatic effect occurs after degeneration of the sympathetic.

Joseph demonstrated that epinephrine was to some extent counteracted by physostigmine; and Githens and Meltzer state that pituitary extract also counteracts the mydriasis in healthy animals.

The intraocular tension, according to Rupert, is first lowered and then increased.

Sollmann⁵ records that this mydriatic effect occurs readily in frogs, but only in mammals under specially favourable conditions.

The mydriatic response in healthy frogs is especially strong, and may, it is said by Meltzer and Auer, be produced by systemic application, in extremely diluted solution, of adrenaline (1 in 100,000).

Post⁶ has noticed dilatation of the pupil after instillation of adrenaline in cases of glaucoma and keratitis.

H. Straub in 1919 found that mydriasis occurred if the excitability of the sympathetic is increased as in Graves's disease and in acute pancreatitis. Later it was found that mydriasis occurs in all types of hyperaemia. The sensitiveness is also increased in chronic nephritis.

A mydriatic response may be obtained a few days after excision of the superior cervical ganglion. In many of these cases the mydriasis was accompanied by other evidences of ocular stimulation, such as separation of the lids, and protrusion of the eyeball.

W. H. Schultz records that in mammalia mydriasis only follows after large doses given intravenously; and adds that mydriasis may be obtained if the oculomotor tone is low, with weak illumination.

In man the effect is only invoked in exceptional circumstances, and then it usually signifies a lesion which involves the sympathetic. Straub states that it may occur if absorption is hastened by conjunctivitis.

The signification of a dilated pupil in irritation of the cervical sympathetic from wounds or growths is well known, but that dilatation can sometimes be produced by adrenaline in such diseases as acute pancreatitis and exophthalmic goitre is apt to be overlooked. Given a normal sympathetic system the power of adrenaline over the iris in man is null.

This drug, so frequently used by ophthalmic surgeons, should not be banned from the arsenal of the general physician. I have never seen any ill effects following its

use as a test, nor can I find any reports of cases in which trouble ensued.

Foster Moore,⁷ quoting from de Schweinitz, writes: "Instillation of adrenaline, ordinarily inactive in causing dilatation of the pupil, becomes exceedingly active when the sympathetic is cut, or the superior ganglion is removed."

In conclusion it is to be noted that the response does not always occur in the numerous diseases mentioned; and therefore, while a positive reaction is valuable, a negative one does not exclude the suspected disease.

Method of Application.—One or two drops of a solution of chloride of adrenaline (1 in 1,000) are dropped into one eye, the other being reserved for comparison. The light should be subdued, as a glare is likely to impede dilatation. The conjunctiva will immediately blanch. If there is no dilatation of the pupil in ten minutes the instillation should be repeated. A dropper that has once been used for atropine should never be employed.

REFERENCES.

- ¹ *Trans. Ophthalm. Soc.*, 1903, p. 374. ² Grandclément: *La Clin. Ophthalmol.*, 1904. ³ *Ophthalmoscope*, 1908, p. 785. ⁴ Coope, R.: *Diagnosis of Pancreatic Diseases*, 1927. ⁵ Sollmann: *Manual of Pharmacology*, 1926, p. 440. ⁶ Post: *Ophthalmoscope*, vol. vi, p. 786. ⁷ Moore, Foster: *Medical Ophthalmology*, p. 95.

THE 1927 EPIDEMIC OF DENGUE IN EGYPT.

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For several years Egypt was practically free from dengue; the last epidemic, prior to that here recorded, occurred in 1906-7 at Port Said and the Suez Canal zone. Last year, however, a sudden epidemic affected the whole country from the shores of the Mediterranean to the extreme south of Upper Egypt, preceded by equally sudden climatic changes. Thunder-storms, winds, and rains swept the whole country, and were followed by the appearance of dengue and other afflictions, such as the invasion of the Nile Valley by locusts, which constituted a very serious danger to agriculture. The epidemic started at the end of September; daily admissions of 30 or 40 cases of dengue were warded in the Government Fever Hospital, Cairo, while thousands of patients were attacked in the town with remarkable rapidity. Groups of policemen on duty in certain streets were attacked as a whole.

Thanks to the experiments organized by the Medical Departmental Research Board of the U.S.A. army and others, we now know that a patient with dengue fever can infect *Aedes aegypti* (*Stegomyia fasciata*) during, at any rate, the first three days of his illness. The dengue virus appears to remain in the infected mosquito for about eleven days before the mosquito can transmit it to non-immunes, and the infected mosquitos continue to propagate the disease probably throughout the remainder of their lives.¹

The *Philippine Journal of Science* published in 1926 most important information concerning the insect vector of dengue. It was proved that the vector is *Aedes aegypti* (*Stegomyia fasciata*) and not *Culex quinquefasciatus* (*C. fatigans*). It was also proved that a dengue patient might infect mosquitos during a period from a few hours before the first symptoms appear to the end of the second day of the disease, and possibly, though with less certainty, for another twenty-four hours or so, after which mosquito infection fails.²

The virus of dengue is at one stage, at least, an ultra-microscopical filterable one, and is present in the patients' peripheral circulation up to the third day of illness. It is also transmitted by blood or filtrate to non-immunes. The piroplasma-like organism of Graham is probably an artefact. The incubation period is usually from four to seven days.

CHART 1.—Abortive type. Duration of illness before admission one day.

The mortality of this epidemic in Egypt was *nil* and the immunity variable. The following were the chief characteristics of the epidemic.

Symptoms and Signs.

Prodromal symptoms were observed in many cases, headache, malaise, and anorexia being the chief complaints. The onset was usually sudden. The patient while on

and lasted from a few hours to one week. It was either morbilliform, scarlatiniform, or petechial (like that of relapsing fever). When it belonged to the first two types it was not so bright. Over the extensor surfaces of the legs and forearms it was decidedly more pinkish. The rash appeared first on the dorsal aspects of the forearms and legs, then on the face, neck, chest, trunk, and upper and lower extremities (including palms and soles), but it was some-

CHART 2.—Intermittent type. Duration of illness before admission one day.

CHART 3.—Intermittent type. Duration of illness before admission two days.

CHART 4.—Intermittent type. Duration of illness before admission three days.

duty developed high fever, preceded at times by rigors; he suffered from severe frontal headache, vomiting, and excruciating pain in the lumbo-sacral region, and over the joints of both limbs. Some patients became unconscious and remained so for a period ranging from a few hours to two days. Many were semi-conscious and drowsy; others were mentally and physically depressed, although their temperature was not high. The face was usually congested and sometimes swollen; the eyes appeared sleepy and photophobia was frequent.

The fever lasted from three to seven days, and was

times absent on the trunk. Desquamation was not the rule, but when it occurred it was of the branny type, accompanied by severe itching, and lasted for a few weeks. This rash is the most characteristic feature of the disease.

Circulatory Symptoms.—Precordial distress was noticed in a few cases. No heart lesion could be traced to dengue. Haematemesis, haematuria, and haemoptysis were rare. The pulse was usually slow throughout the disease, but more so towards the end of the fever, ninety beats being the average number per minute, with a temperature of 39° C., and fifty beats when convalescence started. There

CHART 5.—Remittent or saddle-back type. Duration of illness before admission one day.

CHART 6.—Remittent or saddle-back type. Duration of illness before admission one day.

CHART 7.—Remittent or saddle-back type. Duration of illness before admission two days.

usually of the saddle-back type. Very rarely patients were afebrile throughout the disease, and such were, therefore, a constant menace as potential spreaders of the malady. The following were the types of pyrexia noticed:

1. Abortive type in which pyrexia lasted from one to three days (Chart 1).
2. Intermittent type in which pyrexia lasted usually for seven days; the intermissions were sometimes separated by a period of normal temperature for one or two days (Charts 2-4).
3. Saddle-back type or remittent temperature (Charts 5-7).
4. Continuous type with febrile plateau (Chart 8).
5. Long type in which fever continued for ten to fifteen days (Chart 9).

The degree of fever was in no relation to the severity of the attack. High temperatures were sometimes accompanied by mild symptoms, and vice versa. The onset of fever and its decline were both by crisis; rarely the pyrexia ended by lysis. The fall of fever was accompanied by various phenomena, of which the chief were diarrhoea, dysenteric stools, epistaxis, haematemesis, haematuria, heart failure, and, rarely, syncope.

The Rash.—The initial rash, which was nothing more than a flushing of the face and sides of neck and chest, was rather common. It appeared usually on the first day, and lasted from one hour to three days; it was frequently accompanied by inflammation of the throat. The secondary rash appeared about the fifth or sixth day of the illness,

have been cases where the pulse was rapid at first (120 per minute), but most of these ended in bradycardia. Cultures of the virus from the patients' blood were not successful at our laboratory. Examination of the blood showed an average leucopenia of 4,000 to 5,000 per c.mm. as a constant feature. This decrease in the number of leucocytes affected the polymorphonuclears most. A relative increase of eosinophilia and large lymphocytes was also noticed.

Except for the occasional congestion of the nose, throat, and larynx, the respiratory complications were rare. Pulmonary congestion was only seen in a very few cases.

No enlargement of the lymphatic glands was noticed, although it is mentioned that in some epidemics a considerable proportion of patients develop enlarged glands.

The pains were mostly muscular in origin, and therefore aggravated on contraction of the affected muscles. Nearly all muscles were affected, the most common being the ocular, iliopsoas, quadriceps, biceps brachialis, intercostals, and supra-, infra-, and sub-scapular muscles. The degree of pain varied from slight aching to excruciating pains which morphine alone could alleviate. There were no joint lesions. Headache was a prominent symptom in this epidemic; in one instance it lasted over seven days, during which the patient could neither sleep nor obtain ease without drugs.

Gastro-intestinal Symptoms.—Fetid breath was noted in

CHART 8.—Continuous type. Duration of illness before admission one day.

CHART 9.—Long type. One day ill before admission.

a few cases. The tongue was nearly always coated at the dorsum and red at the margins. Tonsillitis and pharyngitis were fairly common. No parotitis was met with. Nausea and vomiting were usual at the commencement, but rarely persisted throughout the disease. Constipation was the rule, and was followed by diarrhoea at the terminal crisis. Dysenteric symptoms were present in a few cases throughout the malady. No changes were observed in liver or spleen that could be attributed to dengue.

Urinary System.—Albuminuria was common but transient. One case of acute nephritis was reported. Chronic kidney disease is likely to end by uraemia as the result of an attack of dengue. Diabetic patients when attacked sometimes developed a fatal coma, even during convalescence. Epididymitis, orchitis, cystitis, etc., were not met with.

Complications.—These were rare. Those met with were: pharyngitis, rhinitis, gastritis, enteritis, nephritis, and thrombosis.

Sequelae.—Itching of body, irritation of palms and soles, mental depression, vertigo, motor paresis, peripheral neuritis, staccato speech.

Children were just as liable to be attacked by dengue as adults. Males and females were affected equally. No deaths occurred among children.

Convalescence may be short or long—one day to three months. Patients lose weight, and usually suffer from mental depression, debility, loss of appetite, bradycardia, migraine, and neuritis. Relapses are rare.

Diagnosis.

In this season (December) in Egypt dengue has to be diagnosed from the following diseases:

(a) Malaria: by examination of blood films, size of spleen and liver, time incidence of febrile attacks, and rapid pulse.

(b) Measles: starts less suddenly; presence of Koplik's spots, coryza, absence of pains, rapid pulse, and deep red rash.

(c) Influenza: is usually accompanied by respiratory involvement, rapid pulse, and absence of rash.

(d) Scarlet fever: diagnosed by presence of throat symptoms, rash, rapid pulse, absence of pains, and blood examination.

(e) Small-pox: in the first three days of dengue it is very difficult to differentiate it from small-pox. Later on the course of the malady soon manifests its nature. History of vaccination may help.

(f) Articular rheumatism: diagnosed by history of malady, presence of acid sweats, and joint lesions.

The treatment is symptomatic and prophylaxis involves antimosquito measures.

REFERENCES.

¹ *British Medical Journal*, June 27th, 1925, p. 1185. ² *Ibid.*, September 11th, 1926, p. 489.

DUPLICATION OF THE SPINAL CORD.

BY

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AN excellent review of the known cases of partial doubling of the spinal cord was written in 1906 by A. Bruce, Stuart McDonald, and J. H. H. Pirie¹; for the reference to it I am indebted to Dr. Kinnier Wilson. Nevertheless, the following case perhaps deserves a note.

The patient, a well-developed man, aged 51, was admitted to hospital on March 29th, 1928, with a spastic paretic ataxic gait and signs suggesting combined degeneration of the spinal cord. He had a pale, sallow face; the liver was considerably enlarged, and the spleen could be felt, reaching just below the ribs. The gastric contents after a test breakfast contained no free hydrochloric acid. The erythrocyte count was 3,392,000 and the haemoglobin was 70 per cent. The white cells were 17,800 (polymorphonuclears 74 per cent., lymphocytes 17 per cent., monocytes 9 per cent.). The Wassermann reaction was negative. There was a little irregular pyrexia, and apparently a remnant of pneumonia in the middle part of the right lung, which possibly explained the presence of a polymorphonuclear leucocytosis. According to the history obtained the patient had noticed something wrong with his feet in August, 1927, and since December, 1927, he had been taking an "ox-liver juice" twice daily for anaemia. The result of the ox-liver treatment was said to have been good, till weakness in his legs developed ten days before admission.

In the hospital, in spite of liver diet, etc., the weakness in the legs increased, paradoxical incontinence of urine and cystitis, with bedsores, developed, and death occurred on April 26th.

The necropsy and microscopical examination confirmed the diagnosis of combined degeneration of the spinal cord; but during the macroscopical examination it was noticed that, close along the left side of the lower part of the spinal cord, there was another cord-like body of the same consistence as the cord, but smaller (about 1 cm. in diameter) and without nerve roots proceeding from it. Its upper end arose from the substance of the cord by a base somewhat over 1 cm. in diameter, the uppermost part of its insertion being $7\frac{1}{2}$ cm. above the terminal point of the conus terminalis. At its lower (free) end it tapered to a point, which was $1\frac{1}{2}$ cm. above the lower end of the conus terminalis.

Transverse microscopical sections of this macroscopically tumour-like appendage of the spinal cord showed it to be quite obviously a fairly well-developed duplicate cord with a central canal, etc. This was kindly confirmed by Dr. J. G. Greenfield, who also confirmed the fact that the duplicate cord showed well-marked signs of combined degeneration, just as did the main spinal cord (from which the cauda equina arose).

When I saw the long polypoid tumour-like appendage lying along the left side of the lower portion of the spinal cord, I at first thought that I had made a mistake in the diagnosis, and that the patient's paraplegia, etc., might have been due to a tumour; but microscopical examination, as already stated, completely cleared up the nature of the tumour-like structure, proving it to be a congenital abnormality, a doubling of the lower part of the spinal cord. One may wonder whether in this case lipiodol would have been partially arrested at the site of origin of the duplicate cord had it been used to ascertain the site of a possible tumour.

REFERENCE.

¹ A Second Case of Partial Doubling of the Spinal Cord, *Rev. Neur. and Psych.*, Edinburgh, 1905, iv, p. 6.

THE ETIOLOGY OF MONGOLISM;

WITH A CASE OF MONGOL TWIN.

BY

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THE occurrence recently, in my hospital practice, of a case of twins, one of whom was a Mongolian imbecile, the other not, stimulated investigation into the etiology of that distressing and increasingly common type of mental deficiency. But the *ultimate* cause of Mongolism is, I suppose, as yet unknown, nor can I find much to elucidate it.

The peculiar history so often obtained—namely, that the child is either the first of a very young mother, or, as often happens, is born many years after the previous one, and most frequently of a mother nearing the menopause—warrants the assumption that this developmental error is in some way due to immaturity or exhaustion of her procreative powers.¹ At what stage in the development of the ovum or foetus this makes itself felt has been the subject of a good deal of argument.

The problem is this: Is Mongolism inherent in the unfertilized ovum, or is it acquired after fertilization? A third proposition might be that Mongolism is imparted to the ovum in fertilization, were it not that the history appears to point to the maternal factor so constantly. As a generality it may be assumed that parents are approximately the same age, the father being on the average a year or two the elder. This would make the odds even as between the two parents, were it not that there is no evidence, known to me, that the children of elderly men tend to Mongolism otherwise than when their wives are approaching the menopause. Nevertheless, this possible factor cannot be entirely brushed aside without consideration.

An argument in favour of the post-fertilization embryonic theory is that Mongols are so often the subjects of other congenital abnormalities. Of these the commonest are malformations of the heart, followed a long way behind by congenital cataract—defects which obviously cannot