While indiscriminate operations on the nose and accessory sinuses of asthmatics should be condemned, they must, if attempted, be radical. Thus it is useless to remove a polyp without treating the underlying sinusitis, as the polyp will recur. Similarly, it is essential in the case of an enlarged middle turbinal, which is pressing on the posterior septum, to remove that portion of the turbinal which touches and irritates the sensitive part of the septum. Definitely infected sinuses should always be treated either surgically or more conservatively by means of intranasal irrigation, nasal packs (Dowling pack), inhalations, and sprays. The hyperplastic type of sinus disease should, however, never receive operative treatment, and should be left severely alone. The same may be said of swollen and oedematous turbinals which are not causing nose-block and are not impinging on the sensitive area. Polypi should be removed, but the operative results are distinctly poor on the whole, except for an occasional brilliant success. In some cases they have a great tendency to recur, and the patient undergoes numerous operations with very little benefit unless the accompanying sinusitis is treated as well. Tonsillectomy should be done whenever the tonsils are definitely infected, but not otherwise; in a certain number of children the results are gratifying.

As a corollary to nasal treatment it is most important that the patient should be educated to breathe correctly once a free air-way has been established. Many patients, who habitually or from some nasal block are mouth-breathers, have to be re-educated to breathe through the nose. Often these mouth-breathers rapidly develop a typical asthmatic chest, over-expanded in its upper half, narrow at the base, and taking the shape of an inverted flask. This deformity is due to the fact that during an asthmatic paroxysm the respiration in these patients is almost entirely of the upper thoracic type, the lower part of the chest remaining practically immobile owing to a spasm of the diaphragm. Expiratory breathing exercises and exercises devised to develop diaphragmatic breathing are of the very greatest value in such cases.

In concluding, one may say that nasal symptoms often do not disclose the part which the nose is playing as an aetiological factor in asthma, as they themselves may be due to an allergic reaction. The presence of nasal abnormalities in the nose and throat is of no greater help, as they are often coincidental or are also a result of the asthma.

1. In a series of 326 cases of asthma about half the number of patients complained at one time or another of nasal symptoms. These symptoms were mostly due to vasomotor affections of the nose and not true coryzal attacks.

2. Vasomotor affections of the nose and throat occurred in all types of sensitivity, but were definitely more common in pollen-sensitive cases of asthma.

3. Abnormalities of the nose and throat were found in 77.9 per cent. of cases, but were mostly coincidental and minor causal factors.

4. Turbinal hypertrophy and hyperplastic sinus disease were often the result rather than the cause of the asthma, and were found slightly more frequently in protein-sensitive cases.

5. Of 135 cases which received operative treatment, 109 cases were followed up, and of these 50.4 per cent. were improved and 2.7 per cent. (three cases) were "cured."

I am indebted to Mr. E. W. Bain and to Mr. W. Maxwell Munby for the rhinological reports of all the cases reviewed in this paper.

REFERENCES

- ¹ Hurst, A. F.: *Practitioner*, 1929, cxxiii, 4.
- ² Williams: *Brit. Assoc. Reports*, 1840, p. 411.
- ³ Dixon and Brodie: *Journ. Physiol.*, 1903, xxix, 97.
- ⁴ Dixon and Ransom: *Ibid.*, 1912-13, xlv, 413.

⁵ Prevost and Saloz: *Arch. Int. de Physiol.*, 1909, viii, 327.

⁶ Becker: Quoted by Bray, G. W., *Recent Advances in Allergy*, London, 1931, p. 115.

⁷ Stotland, Sherwood, and Woodbury: Thirteenth International Physiological Congress, p. 261.

⁸ Freund and Gottlieb: Quoted by McDowall.¹²

⁹ Dodel, P.: *Ire Congrès Int. de l'Asthme*, Le Mont-Dore, 1932, ii, 79.

¹⁰ Epstein, A.: *Ibid.*, pp. 115 and 149.

¹¹ Tiefensee: Quoted by Epstein.¹⁰

¹² McDowall, R. J. S.: *Practitioner*, 1930, cxxiv, 212.

¹³ Pottenger, F. M.: *Amer. Journ. Med. Sci.*, 1924, clxvii, 203.

¹⁴ Lemke: Quoted by Coca, Walzer, Thommen: *Asthma and Hay Fever in Theory and Practice*, London, 1931, p. 191.

¹⁵ Kern and Donnelly: *Journ. Allergy*, 1931-2, iii, 172.

¹⁶ Piness and Miller: *Journ. Amer. Med. Assoc.*, 1925, lxxxv, 339.

¹⁷ Kahn, M. H.: *Ibid.*, 1924, lxxxii, 536.

¹⁸ Dundas-Grant, J.: *Practitioner*, 1913, xc, 914.

¹⁹ Heatley and Crowe: *Bull. Johns Hopkins Hosp.*, 1923, xxxiv, 410.

²⁰ Tod, M. C.: *Journ. Laryngol.*, 1925, xl, 582.

²¹ Lierle, D. M.: *Ann. Otol., Rhinol. and Laryngol.*, 1926-7, xxxv, 544.

²² Leopold and Fetterolf: *Atlantic Med. Journ.*, 1927, xxx, 286.

²³ Rackemann and Tobey: *Arch. Otolaryngol.*, 1929, ix, 612.

²⁴ Lyon and Murray-Lyon: *British Medical Journal*, 1930, i, 987.

THE TREATMENT OF BACTERIAL FOOD POISONING

BY

GEORGE R. McROBERT, M.D.ABERD., M.R.C.P.LOND.,
D.T.M. and H.

MAJOR I.M.S., BURMA

Although bacterial food poisoning is by no means uncommon in Great Britain, it is in the more torrid portions of the world that it takes a really prominent place among the acute medical emergencies met with in practice. The low standard of personal and family hygiene among those who handle and cook food in many warm countries, together with the prevalence of flies and conditions of atmospheric temperature and humidity most suitable for the multiplication of the organisms concerned, lead to the high incidence of the *Salmonella* type of bacterial food poisoning.

Symptomatology

Many persons spend years of residence in warm countries without contracting malaria, dysentery, or other characteristically tropical diseases, but few escape one or more attacks of the condition now under consideration.

The following is a typical case from my records:

Of eight persons dining together in Rangoon one night in 1928 only five partook of the savoury, at 9 p.m. All five suffered from bacterial food poisoning—the symptoms showing themselves in Mrs. A. at 3 a.m., Mrs. B. at 8 a.m., Mr. A. at 10 a.m., Mr. B. at 11 a.m., and Mr. C. at 4.30 p.m. The severity of the attacks and the rapidity of onset were definitely correlated—Mrs. A. having severe vomiting and diarrhoea and marked collapse, whilst Mr. C. had moderate abdominal pain and diarrhoea, without vomiting and collapse.

It is not only essential, therefore, that medical men practising in such countries should have a firm grasp of the principles of treatment, but it is important that those acting in an advisory capacity to services and firms with men working far from medical help in jungles and forests should issue "first-aid" instructions for the future benefit and protection of their clients.

In severe infections the incubation period is short (two to six hours), and although all those who eat the infected food may suffer acutely, one patient may be very much worse than the others. In such cases it is not unusual to find that the patient most severely afflicted has been suffering from a mild gastro-intestinal upset for some time.

Captain M., aged 25, staying at a hotel in India in 1920, had been suffering from loss of appetite, furred tongue, and mild diarrhoea for over a month without reporting sick. He

was awakened early one morning by violent abdominal pain. Severe diarrhoea occurred, and the motions, at first coloured, soon became "rice-water" in appearance and consistency. Violent vomiting ensued after the purgation had commenced, and a state of collapse was soon reached. The tissues were greatly dehydrated, the condition of "washerwoman's fingers" was noted, and, before losing consciousness, the patient complained of agonizing leg cramps. He ultimately recovered, but was confined to bed for three weeks. A number of other guests at the same hotel suffered from abdominal pain and moderately severe diarrhoea without collapse, but in Captain M. alone were the symptoms suggestive of cholera, which diagnosis was excluded by bacteriological examination, an organism of the *Salmonella* group being held responsible.

The notion that diarrhoea and vomiting may be treated by opiates only does harm, and much harm has been done in the past by too early and too frequent recourse to the camphorodyne or laudanum bottles, with resulting intestinal stasis, multiplication of pathogenic organisms and their toxins, and rapidly developing toxæmia.

Principles of Treatment

The rules to be adopted in dealing with cases of bacterial food poisoning are:

1. Rest in bed.
2. No solid food.
3. Neutralize the effects of toxins already absorbed.
4. Prevent further absorption.
5. Allay the pain.
6. Ensure the removal of the infecting organisms and their poisonous products from the body.
7. Gradually work up the diet from liquid only, through stages of bland, non-irritating substances, to normal.

All but the very mildest cases should be dealt with as bed patients. Warmth is essential—general, as well as local to the abdomen, in the form of hot-water bottles or turpentine stupes. Nothing but fluids may be given by mouth until the diarrhoea has ceased.

The administration of an ounce of castor oil with a few minims of tincture of opium or camphorodyne has formed the basis of treatment for many years, and may still be employed in mild cases. It gets rid of the irritating and infective intestinal contents, and is followed by a number of doses of an astringent mixture. It very frequently happens, however, that the stomach will not retain castor oil or magnesium sulphate, and, in the presence of severe vomiting and collapse, it has been recommended that collapse and dehydration should be combated by intravenous salines, warmth, and opium, before any attempt is made to clear out the gut by means of purgatives. Delay is nevertheless dangerous, for whilst the existing toxæmia is being dealt with the gastro-intestinal condition is getting worse, and further toxins are being absorbed.

Use of Kaolin

For some years I have completely abandoned the early use of purgatives in bacterial food poisoning, and now rely completely on the adsorptive action of fine kaolin. Kaolin B.P. is rather a gritty preparation, does not make a very fine suspension in water, and is somewhat nauseating, but there are on the market a number of fine, smooth, "colloidal" preparations of kaolin which make a palatable and even suspension in water. These are not readily rejected even by the most inflamed and irritated stomach, and they serve to detoxicate the bowel contents whilst soothing and protecting the lining of the gut. In even the most severe cases, therefore, the work of detoxicating the gastro-intestinal contents may proceed *pari passu* with the treatment of the already established toxæmia.

If collapse and dehydration are marked the patient, in bed with warm bottles and blankets, is given gum-saline or Rogers's hypertonic saline intravenously at a very

slow rate. If the patient has previously been in a poor state of nutrition glucose may be added to the saline with advantage, so as to protect the hepatic cells from the action of toxins. At the same time the oral administration of fine kaolin—2 drachms to a wineglassful of water—is commenced, sips being given as frequently as possible. Morphine 1/6 grain to 1/4 grain may now be given subcutaneously without fear of increasing the toxæmia. The amount of fine kaolin which can be retained varies in different cases, but it is generally possible to give 4 drachms of the powder in the first hour of administration; thereafter 1 drachm is given every fifteen minutes, in as much water as the patient will take, until the diarrhoea is controlled. Gastric and colonic lavage, which were formerly practised in cases of vomiting as a preliminary to the administration of castor oil, are, I believe, no longer necessary.

In cases of less severity, without collapse, rest, frequent doses of fine kaolin, and large quantities of fluid by mouth, with morphine if colic is severe, result in very rapid improvement. With the introduction of fine kaolin treatment, the use of lead and opium, kino and catechu, and other astringent mixtures formerly used as a follow-up to castor oil administration, can be abandoned. A certain amount of judgement is necessary to avoid the production of constipation by the kaolin, but the judicious use of liquid paraffin or of a saline preparation along with the kaolin, on or after the second day, obviates this minor disadvantage of the treatment.

Great care must be taken in building up the diet after the diarrhoea and vomiting have been controlled. There is still too great a tendency to make excessively free use of milk in the early stages. Milk is a solid, not a liquid, food. Chief reliance for the supply of calories should be placed on the use of glucose water flavoured with lemon juice until the acute stage is over.

Thereafter, whey, egg albumen, and Benger's food may be added, and a normal diet be gradually built up with the proviso that flesh and fibrous foods should be withheld until convalescence is thoroughly established.

Conclusion

A large number of missionaries, forest officers, and jungle employees of timber and mining firms now carry a tin of fine kaolin as part of their regular camp equipment, and reports received from them confirm my opinion that the introduction of fine kaolin is one of the most important advances in practical everyday therapeutics of recent years.

In one case an outbreak of acute diarrhoea and vomiting occurred at a missionary conference in Burma in 1932 within three hours of the evening meal. A number of elderly men and women were affected, and with such an early and acute onset one would, in the pre-kaolin days, have expected severe collapse and a good deal of anxiety in the course of treatment. Fine kaolin treatment was instituted by a missionary before I was summoned, and on my arrival nothing more was necessary than the administration of morphine to two patients and an order to continue the treatment already instituted. All the affected persons were able to leave the station within a few days.

Mr. Arthur Evans of the Westminster Hospital has very kindly presented to the medical superintendent (Sir Thomas Carey Evans) of the Hammersmith Hospital his collection of pathological specimens illustrating diseases of the gall-bladder for the museum of the post-graduate medical school, which is at present under construction. Each specimen is beautifully mounted with a complete clinical history of the case. This will be most useful for teaching purposes, and will form the nucleus for the new museum. It is to be hoped that similar collections will be added to the museum in due course.