

## The Blue Epidemic Cholera — Some Aspects of Treatment in the Mid 19th Century

Maj W Bonnici  
MRCGP, DCH, RAMC

Garrison Medical Centre, Haig Barracks, BFPO 30

**SUMMARY:** Cholera was first recorded in the Indian sub-continent in 1817 from where pandemics reached Europe via trade and pilgrim routes. Notwithstanding the numerous therapeutic methods prescribed, the virulence of cholera remained unabated. This article describes some of the proposed treatment regimes in relation to the assumed pathophysiology.

On 19 August 1867, the First Battalion, the 14th (Buckinghamshire) Regiment of Foot, embarked at Queenstown for Malta. They arrived there ten days later, where six Companies disembarked from HMS "Himalaya" and marched to Pembroke Camp at St George's Bay. The troops were in station for a mere three days before Pte John Riley, aged 22 years, went down with diarrhoea and succumbed to cholera on 2 September. As more troops, women, and children fell ill and died, the detachment was moved to Fort Chambray in Gozo, and placed under canvas. The barrack rooms were whitewashed in an attempt to halt the spread of the epidemic, and the troops returned to Pembroke Camp on 27 October, in preparation for the start of the annual course of musketry on 1 November (1). During this outbreak which lasted from 5 July to 25 November the Malta garrison had 630 cases with 119 deaths (19% mortality), whereas among the civilian community there were 403 cases with 259 deaths (64% mortality) (Fig 1). The sick were transferred to the Forrest Hospital, in neighbouring St Julian's Bay. This was a spacious residence built in 1688, which had been converted to a General hospital in 1860, and named after the Principal Medical Officer of the garrison.

The ravages of cholera among a captive body of troops invariably generated a degree of panic. Those admitted to the regimental hospitals hardly ever returned to their units particularly as the regimental surgeon had no effective way of preventing or curing the disease. This was noted by the adjutant of the 44th Foot who, during the cholera epidemic in Malta of 1850, instituted a programme of athletic events in order to keep his men in good physical health and their minds free from sombre thoughts.

### Nature and Aetiology of Cholera

Cholera was thought to be due to a poison, for only a toxin could in the space of a very short time reduce a healthy man to a skeleton of his former self. The identity of this toxin remained obscure until Robert Koch isolated the comma bacillus in 1883. John Snow had in 1854 established cholera as a waterborne disease, but the absence of an identifiable agent sustained the controversy between contagionists and non contagionists.



**Fig 1.** Ta Braxia Cemetery Malta. Memorial erected by 1/14 Foot in memory of those who died during the outbreak of cholera shortly after the arrival of the battalion in Malta in 1867.

The contagionists maintained that cholera was due to a specific virus transferable from person to person by social intercourse, by clothing, or by excreta of cholera patients, and advocated a strict quarantine of twenty five days. On the other hand the General Board of Health asserted that cholera was propagated not by contact of one infected person with another, but through "a general influence operating on particular localities and persons, according to certain localizing conditions and predisposing causes" (2). Overcrowding, filth, malaria from putrescent mud, dampness and improper diets were recognised as relevant predisposing local factors. In his letter to a country patient published in 1848, Thomas Weeden Cooke asserted that the absolute cause of cholera was the presence of "some mephitic substance added to the air we breathe, or an alteration in the electrical condition of the air" (3). Thus all those who inhaled the contaminated air would be expected to contract cholera, but as this was not inevitable, it was inferred that some were more susceptible to the disease than others. Drunkards were considered to be at in-

creased risk, and attacks of cholera among artisans were observed to occur more frequently at the beginning of the week. This chance observation was thought to be due to their heavy weekend drinking coinciding with pay day. Another especially significant factor was any alteration in the normal healthy function of the bowel. This was considered so important that the public was exhorted to seek medical help at the earliest manifestation of diarrhoea, so as to arrest its progression to malignant cholera. Weeden Cooke went so far as to declare that "If people die to any extent of cholera . . . it must be their own fault. They will die for want of simple precautions and simple remedies . . . I can say that the always present premonitory symptoms of diarrhoea even amongst the ill clad, the ill fed, and the dissipated, if treated, was never followed by an attack of malignant cholera." Entrepreneurs exploited the fear that impure air caused diarrhoea, and those able to pay sought sanctuary in alternative medicine. Amongst those promising cures was a Mr E Goodeoungh, who in 1850, used the local press to advertise the sale, at one shilling and sixpence per box of "the celebrated German Pastilles such as were burned with so much success during the prevalence of cholera in Germany" (4). Chilling of the skin of the lower abdomen was considered deleterious to the underlying viscera and flannel belts were in general use to counteract this. Cholera belts warmed the skin, relaxed the skin pores, and enabled the miasmatic poison to escape via the perspiration. Others held the view that the belt acted as some sort of filter which kept at bay the impurities of the surrounding air. Its wear was not universally accepted as being effective in the prevention of cholera. Notwithstanding, cholera belts were issued to troops during the Crimean War. On the outbreak of cholera in an overseas station, soldiers were authorised to draw two cholera belts each, and were fined a shilling for every belt damaged or lost.

### Pathology of Cholera

The pathophysiological defect in cholera is the loss of large quantities of isotonic fluid. It was thought that the inhaled poison exerted its influence via the ramifications of the vagus nerve and abolished the retentive powers of the minute visceral arteries. A speculative account from 1850 rationalised it thus: "there appears to be a loss of the more fluid part of the blood poured through the exhalent arteries of the stomach and bowels. These exhalents are minute vessels which under common circumstances only exhale a vapour to lubricate and soften the lining membrane of the intestines. Suddenly the power of retention is taken off, and from thousands of these patulous orifices flows out the serum or whey of the blood leaving behind a dark uncirculable mass resembling treacle" (5). The brain oversaw this harmonious control of the exhalent arteries, asserted William Parker in 1849. "The brain being the prime mover of every other organ, the healthy action of all others are subsequent to it being in a normal state" (6). W Parker

surmised that the depletion of nitrogen from the body deprived the brain of its nourishment, and consequent to the brain being denied its food, it went into a state of languor and became incapable of exerting its retentive powers on the blood vessels. He therefore advocated the administration of ammonium salts to revitalize it, just as the inhalation of aromatic ammonia revives a patient from her faint.

### Clinical Features and Modes of Treatment

The clinical picture in cholera is one of dehydration. Cholera presents with copious, painless, watery diarrhoea. Projectile vomiting follows, and the incessant vomiting and profuse diarrhoea lead to hypovolaemia. The circulation becomes sluggish and the radial pulse is barely perceptible. The body temperature drops, the skin becomes ice-cold and covered by clammy perspiration. The patient develops painful lower limb muscle cramps, which later become more severe as they spread to affect the whole body. In time cyanosis supervenes to the extent that the patient becomes literally quite black. The skin of the extremities becomes wrinkled, resembling the hands of a washerwoman. He becomes anuric. The eyes are sunk in their sockets. The tongue is cold, the abdomen retracted, and the breathing accelerated. The victim becomes restless and apathetic. His voice a mere whisper which finally becomes inaudible. The patient becomes irritable, has the hiccups, and complains bitterly of a peculiar sensation of contraction and oppression in the pit of the stomach. The intellect remains unimpaired until coma sets in, preceding death (7).

Although this classic description of gross dehydration was well recognised, the established treatment of cholera aimed at checking diarrhoea as promptly as possible, rather than replenishing circulatory fluids. Diarrhoea was brought under control by administering two grains of calomel, with three drops of tincture of opium, taken every five minutes for one hour and then every ten minutes. The calomel was repeated as dictated by the clinical response. If given early enough, this oral mixture was preferred to the subcutaneous injection of morphia. Another effective method for the control of diarrhoea was the application of strong counterirritation to the pneumogastric or vagus nerve in its course between the mastoid process and the angle of the lower jaw. This "acted like magic — the patient sleeping after its use and awakening well" (7).

To stop vomiting, a saline draught containing potassium chlorate, sodium chloride, and sodium bicarbonate made to effervesce with fresh lemon juice was given every half hour in some iced water mixed with cognac. Cramps were eased by the subcutaneous injection of morphia and the placement of flannels soaked in hot water and vinegar.

As most deaths occurred during the period of coldness attempts were made to excite the circulation by heat and stimulants. To warm up the body a large mustard poultice was placed on the abdomen, coupled with the

subcutaneous injection of sulphuric or chloric ether, or small doses of morphine. Hot bottles and bricks were placed next to the patient and the limbs were rubbed with equal parts of ammonia, spirits of camphor, and hot oil of cumin seeds. The hitherto described therapeutic methods were effective in treating mild diarrhoea, but medical assistance was powerless against the full onslaught of the disease. If cholera was due to a toxin, then it may have been possible to reverse the deleterious effects of this poison. Would oxygenating the black stagnant blood of cholera restore its arterial properties and terminate the sequelae of exhaustion and impeded secretions by which the fatal event is induced, enquired William O'Shaughnessy in 1831 (8). Nitrates or chlorates of potash were considered by O'Shaughnessy to possess the greatest quantity of oxygen and to be most suitable in oxidising venous blood. Accordingly, he proposed the injection of these salts into the external jugular vein, preferring this to the inhalation of oxygen gas, which he considered to be of little benefit. However, twenty years later, the *Indian Times* of 1850 reported that a Dr Macrae, civil surgeon at Howrah, had successfully administered oxygen to fifteen European seamen who had been carried to the Howrah hospital in the last stages of the disease and the patients had in every instance recovered (9).

O'Shaughnessy's experimental work on the blood from cholera patients revealed a deficiency of salts and water, and he recommended their replacement to enable the blood to carry out its functions (10). In 1832 Thomas Latta of Leith took the audacious step of putting O'Shaughnessy's theory to the test. He correctly surmised that the loss of the vital body fluids led to death and injecting saline into the vein was "one of the most powerful and one of the safest remedies yet used in the second stage of cholera" (11). As he injected a solution containing three drachms of muriate of soda, with two scruples of the subcarbonate of soda in six pints of water, his patients underwent an unbelievable and truly miraculous transformation. "Like the effects of magic, instead of the pallid aspect of one whom death had sealed as his own, the vital tide was restored, and life and vivacity returned" reported Dr T Latta (11). A Read's patent syringe, having a small silver tube attached to the extremity of the flexible injecting tube was used to administer the large volumes of liquid. In one female patient, 330 ounces were infused in twelve hours.

The *Lancet* was quick in its praise. It expected the treatment to be beneficial in "the desperate cases which have baffled the ordinary methods of treatment, and which would otherwise be abandoned to inevitable death" (12). Miraculous as it was, this form of experimental treatment was not widely accepted. Calomel held sway, and intravenous rehydration was not to reappear until the turn of this century.

### Conclusion

Of the above regimes, few could be said to have been of benefit to the common soldier. The Regimental Surgeon had neither the latest knowledge nor the required logistics to offer an effective cure as proposed by Dr Thomas Latta in the 1830s. Until rehydration became an acceptable form of treatment thousands of soldiers and their families were carried off to their graves by the cholera epidemics in the countries they served.

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