

ship's stoker, a notoriously laborious occupation and one throwing great strain on the heart; this caused the hypertrophy and dilatation of the left ventricle, with the usual sequence of incompetence of the mitral valve and secondary dilatation of the left auricle from overfilling during ventricular systole. Possibly the site of rupture was a particularly weak spot where the backward stream of blood impinged on the auricular wall.

Remarks by Dr. DE HAVILLAND HALL.—The occurrence of rupture of the heart, and especially of the left auricle, is such a rare event that I induced my friend Mr. Foott to place on record this extremely interesting case. The statistics that have been collected on the subject show that in 77 per cent. of the cases of rupture of the heart (excluding cases of traumatism) the rent takes place in the left ventricle, in 14 per cent. in the right ventricle, in 6 per cent. in the right auricle, and in the remaining 3 per cent. in the left auricle. So that the case under consideration belongs to the rarest form of rupture of the heart. As is usually the case, the rupture occurred in a man, but at a much earlier period of life than is common. According to Walshe, "rupture of the heart is favoured by advanced age; it becomes comparatively frequent after the fiftieth, still more so after the sixtieth year." Out of 100 cases collected by Quain in 12 the rupture took place under the age of 50 years and two of these occurred between the ages of ten and 20 years, so that while rupture is very uncommon in early life the possibility of its occurrence should be borne in mind.

Though the authorities whom I have consulted do not appear to lay stress on a laborious occupation as a factor in the production of rupture I think that there is much cogency in the explanation given by Mr. Foott of the cause in his case. Unfortunately, a microscopical examination of the heart muscle was not made, but the naked-eye appearance was in favour of fatty degeneration. Gowers in his article on Fatty Diseases of the Heart in Reynolds's "System of Medicine" says emphatically: "Spontaneous rupture never occurs in a healthy heart," and it is "probable that in at least nine-tenths of the cases of rupture fatty degeneration is the condition of the cardiac wall to which the accident is due."

The mode of onset varies very much; sometimes the rupture is induced by physical exertion or great mental excitement. Of 24 cases collected by Barth, in five death occurred during the act of defecation. It may occur during sleep, as in a case of spontaneous rupture of the left auricle reported by Dr. M. Mackintosh.¹ In the classical case of George II., who died from rupture of the right ventricle, it is stated that he rose at his usual hour of six, drank his chocolate, inquired how the wind was, being anxious for the arrival of the mails, and then suddenly fell, uttered a groan and expired.

In Mr. Foott's case there was neither mental nor physical excitement to account for the rupture and there were no premonitory symptoms as sometimes happens. In Dr. Mackintosh's case, for instance, the man complained of pain in the epigastrium in the evening which he attributed to his having had a dinner of hard, badly-cooked beef. He died the same night in his sleep. As Dr. Mackintosh points out, the marked ecchymosis which was found in the neighbourhood of the rent in the left auricle suggests that some laceration took place during his work, causing the pain he complained of, and that the final rupture occurred during sleep, the result being instant death.

NOTES AND COMMENTS UPON FIVE CASES IN WHICH CHLOROFORM ANÆSTHESIA WAS CARRIED OUT BY DUBOIS'S APPARATUS.

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THE induction of anæsthesia by chloroform has fallen into much discredit, although its use is persisted in and ably advocated by some of us. Certain advantages connected with it lead perhaps most of us to regret that we are obliged to abandon its use. Although complete anæsthesia

can be induced by ether in less than three minutes and the irritation and distress often caused by it can be avoided to a great extent by the previous administration of nitrous oxide gas, we seem still to be out of our path and away from perfection. All is vague and haphazard. With ether even young girls may become violent and inebriated and may require large quantities. The profuse frothy mucous secretion and salivation may often cause infinite trouble and some anxiety, and the occasional evil after-effects are known to all.

To the administrator, the anæsthetic employed has mainly to be considered in the two aspects of its chemical and physical properties. The one, however inseparable from the clinical aspect, should be first considered by the physiologist who should furnish us with some certain data for our guidance. The physical problem should never be lost sight of by the administrator himself and is to some extent his to consider. 1. The chemical problem involves a study of the effects of toxic vapours upon nerve. Of these effects we have gained in late years some definite knowledge through the labours of Dr. A. D. Waller. Briefly, nerve resumes its normal reactions after loss of function from exposure to 1.0 to 2.0 per cent. chloroform vapour. By a small excess beyond this nerve may be poisoned and with larger doses it will certainly be poisoned beyond recovery. 2. The physical properties of chloroform make it a grave source of danger. It is customary to use it by the "open method," a small but unmeasured quantity being poured upon lint which is held in the hand at some variable distance from the face. Owing to its high specific gravity the vapour falls in a downward stream, and the approximating of the hand to the face may rapidly raise the percentage inhaled to four or five times beyond the limit of safety. In labour, where chloroform is frequently used and with few accidents, the patient is usually lying on her side, and this permits the vapour to stream past the face, much of it being thus happily wasted. Moreover, the quantity used is but small. The senses are but dulled and complete anæsthesia is neither sought for nor desirable.

No apparatus giving a constant supply of a definite percentage of chloroform vapour is in ordinary use. The Junker inhaler is a notable endeavour in this direction, though it cannot be granted that it supplies a definite and accurate percentage nor that it allows perfect freedom of expiration. Dr. Waller having lately deeply interested me in the method of anæsthesia practised in the physiological laboratory at the University of London (whereby an accurate percentage of chloroform vapour is supplied in a constant stream, the expiration being unimpeded) I obtained the consent of my surgical colleagues on the staff of the Herefordshire General Hospital to use his apparatus on one of their operating days upon a small series of unselected cases occurring in the ordinary course of their work. The anæsthetic was administered by Dr. Waller himself while I closely watched the cases and took notes of their condition.

CASE 1. *Sacro-iliac disease; psoas abscess.*—The patient was a young adult. At 1.23 P.M. the administration was begun; 1.2 per cent. of chloroform. 1.24, increased to 2 per cent. 1.31½, diminished to 1.2 per cent. 1.33, abolition of the conjunctival reflex (ten minutes after commencement). 1.34, operation commenced. 1.37, slight vomiting and retching; administration discontinued for about half a minute. 1.37½, increased percentage to 2 per cent. 1.40, operation completed; administration discontinued. The patient first spoke nine minutes after leaving the theatre. She vomited at 4.25, at 6, and at 6.50 slightly. She had had ether on a former occasion and of the two rather preferred ether.

CASE 2. *Excision of hydrocele.*—The patient was a labourer. At 1.47 P.M. administration was begun; 2 per cent. chloroform was continued throughout. 1.52, stage of excitement and muscular resistance; the patient was talking loudly; pulse-rate 150. 1.55, excitement passing off; pulse-rate 80. 1.56½, complete anæsthesia (nine and a half minutes from commencement). 1.57, operation begun; slight movement at initial incision; still muttering incoherently. 1.59, silence; pulse-rate 108. 2.0, slight stertor; facepiece removed for one or two respirations. 2.2, rather increased stertor. 2.4, quite quiet and breathing easily; pulse-rate 108; respirations 44. 2.7, stitches being inserted, no sign of movement. 2.9, administration discontinued. 2.11, sleeping quietly; no conjunctival reflex; pulse-rate 92. 2.14, dressing completed; pulse-rate 128. 2.15, answered to name and responded not quite incoherently to questions.

CASE 3. *Operation for varicose veins.*—The patient was a

¹ THE LANCET, Feb. 1st, 1890, p. 239.

labourer. At 2.20 P.M. administration was begun; 2 per cent. chloroform. The pulse-rate was 96. 2.23, stage of excitement. 2.26, conjunctival reflex abolished. 2.28, operation began; no movements. 2.38, operation over; administration discontinued. 2.40, conscious of questions; incoherent in reply.

CASE 4. *Operation for removal of cervical glands.*—The patient was a female adult. At 2.48 P.M. administration was begun; 2 per cent. chloroform. 2.54, conjunctival reflex abolished; complete anæsthesia. 2.56, operation began; no reaction to incisions from beginning, no struggling, and no stertor. 3.6, retching, slightly vomiting. 3.16, reduced to 1.2 per cent. chloroform. 3.21, stitches being inserted; no movement. 3.27, operation over; administration discontinued. 3.32, slight retching. The patient first spoke at 3.55. She vomited at 4.20 and at 5.30. She said that she thought (having had chloroform once before some ten years ago) that this time "it was longer in taking and not so strong," she "felt nothing," she "was more sick last time," and "liked this much better."

CASE 5. *Circumcision.*—The patient was a baby, aged three months (?). At 3.35 P.M. administration was begun; 2 per cent. chloroform. 3.38, reflexes abolished; slight movements on removing the prepuce. 3.40½, administration discontinued; all quiet.

Throughout the whole series I was greatly struck with what I must call the maintenance of the anæsthesia upon a smooth plane below the surface of consciousness. Though sunk to a depth beyond sense each case attained a certain level of rest not beyond our reach, neither occasionally rising therefrom nor sinking into any deep and perilous pool. The administration being discontinued each patient quickly rose again to the surface of consciousness. Throughout there was quite an extraordinary absence of anxiety, and I am clear that this feeling was produced through my observation of the patient's real condition under the anæsthetic and was not unduly owing to the fact that for the first time in my experience I knew with some approach to accuracy what was being done. Case 4 had some years previously taken chloroform for the same kind of operation. On this, the later, occasion she was completely under its influence to the full surgical degree for 33 minutes when the administration was discontinued. She could speak 27 minutes afterwards. The next day I asked her to compare her sensations on the two occasions. She said "it was longer in taking and was not so strong." On this last occasion she "felt nothing"; she was "more sick the other time," and "liked this much better." For myself I should without hesitation choose this means if I had again to undergo a surgical operation.

There are few practical difficulties. The use of the apparatus necessitates the turning of a handle attached to a small wheel at the rate of about four revolutions per minute. This can be done by the administrator almost mechanically. But it is better that he should have both hands free and the whole of his attention disengaged. The wheel can be turned by anybody, for it requires no skill and it can be done at a distance from the operating table. It could be worked by a motor or with a treadle by means of some suitable adjustment. By whatever means the stream of vapour is supplied to the facepiece the administration itself is of the utmost simplicity. There is free exit from the facepiece for all expired air and if the chloroform vapour, always of known strength, is supplied in greater abundance than is necessary, it merely passes harmlessly out of the orifices in the facepiece and is not pumped into the lungs. The patient has absolutely no sense of there being any obstruction to his breathing. He is simply inspiring air mixed with chloroform vapour to the extent of 2 per cent. or under, and this maximum quantity cannot be exceeded through any over-zeal on the part of the person, however untutored he may be, who is turning the handle. Excess of zeal means waste of vapour at 2 per cent., no greater percentage can possibly be inspired. The machine itself cannot supply a higher percentage without active interference on the part of the administrator.

I am not surprised to learn that animals can breathe such an atmosphere and remain completely unconscious for many hours at a time without ill-effects. I myself have exhibited it to a cat for several hours and have witnessed the animal half an hour afterwards lapping milk, purring happily, and rubbing itself affectionately against my legs. I am led to think of its possible use in the future in cases other than those of surgical operation. Some may think that the time

occupied in inducing anæsthesia is too long. It is not, for adults, apparently less than six, nor more than ten, minutes. But rapid anæsthesia has been pushed to a point which has roused some protest. These protests might be ignored if the rapid induction of anæsthesia were wholly safe and pleasurable. Since it is not so, and since inhalation as now practised is nearly always very disagreeable and is often terrifying to patients, being a considerable addition to their already pitiable anxieties, I feel that we ought not to deny them this easy and pleasant means of relief. For to say the least we cannot plead that this method is less safe; nor do I see that we have any excuse for not admitting it into our daily hospital practice unless we are prepared to plead against it some small considerations which merely affect our own convenience. But all undue advocacy is to be avoided. The important matter in this connexion is our *clinical* experience of the method, and at this early stage of our experience it is essential that every case in which the method has been applied should be reported without selection, or omission of favourable or unfavourable features, or of actual failures if such should occur.

Hereford.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF ERYTHROMELALGIA.

BY BRUCE C. KELLY, M.B., C.M. EDIN., M.R.C.S. ENG.

VARIOUS theories have been advanced to explain the group of symptoms known as erythromelalgia—e.g., the theories that it is due to a neurosis, to a peripheral nerve lesion, to a spinal lesion, to a cerebral lesion, and to a vascular lesion. The case about to be described, though incomplete because there was no necropsy, would seem to point to a spinal lesion, as do many other recorded cases. In favour of this disease being due to a spinal lesion are the facts that it coexists with tabes dorsalis, disseminated sclerosis, spinal tumours, general paralysis, and other conditions of a like kind. The secretory and vaso-motor troubles in, for example, syringomyelia have their seat in the grey matter of the cord in its middle part adjoining the anterior and posterior cornua. Cases have been described where the peripheral nerves have been found unaffected.

The following is the history of a case occurring in a married woman, 77 years of age, who had no record of neurotic troubles, who had advanced arterial degeneration, who had had three attacks of hemiparesis, and who had no symptoms or physical signs pointing to affection of the peripheral nerves. She began to suffer from erythromelalgia in October, 1901. She had a left-sided hemiparesis a year before. There was no exciting cause, remote or direct, in her history. The illness began with severe "pricking, shooting" pain in the outer part of the left foot, accompanied by redness and swelling of this part of the foot. The pain was paroxysmal and the intervals of freedom from pain became shorter and the paroxysms more severe. After a few weeks there appeared swollen, purplish-red patches on the inner part of the sole and on the heel. The superficial veins of the foot, on the dorsal and plantar aspects, and of the leg were markedly swollen. The surface temperature was raised but pulsation could not be felt. The pain soon extended up to the knee and the whole foot sweated continually. The pain was aggravated by hanging the foot, so that she could not bear to stand, and was temporarily relieved by cold. There were slight pain and dilatation of the veins of the right foot and leg up to the knee. The heart was dilated, with an apical systolic murmur, and there was advanced arterial degeneration. The urine was natural. The skin of the left foot and leg was tender to the touch. Sensibility to heat and cold was normal. Beyond wasting from disuse there was no atrophy of muscles or loss of power and the electrical irritability was normal, as were all the reflexes. There were no trophic changes in the skin or nails. There was no tenderness on pressure over the nerve trunks or