DEATH DURING ANÆSTHESIA

BY

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THE candid discussion of the deaths resulting from any procedure in medicine is compassed about with many difficulties. At best it is painful to lose a patient and it is but natural to shrink from the recollection. For the same reason the "safety" of anaesthesia is a recurrent and fertile subject of argument. Unfortunately any discussion of safety has usually turned on the anaesthetic agent in use instead of on the skill and experience of the administrator of that agent, or on the condition of the patient. Patients vary from a state of perfect health to a condition of impending death; and anaesthetics are administered by persons of no skill or clinical training whatever as well as by men of the greatest learning and the highest competence.

Those who report results in print have often failed, in the past, to state their definition of "mortality." Surgeons are prone to refer to the "immediate" and "remote" mortality of operations without explaining what they mean by these terms. The laudable habit of keeping records accurately in writing is still so new among anaesthetists that to them "mortality" usually means the number of patients who died on the operating table. To some it means death before the recovery of consciousness from anaesthesia. To few does it mean the number of patients who died before their discharge from hospital.
It is unfortunate that in England the practice of Coroners' Courts was to require an inquest on patients who died in the operating room. I believe that the letter of the law was more strict and demanded that any death which occurred before the recovery of consciousness should be reported. The result, however, was that on many occasions a dying patient, whose only faint hope of survival lay in absolute quiet and warmth, has been hurriedly sewn up and returned to bed in the hope that all signs of life would not be extinct before he had passed through the door of the operating room. On one occasion, when to the bystanders it seemed obvious that the patient had been dead for some time, the anaesthetist stoutly maintained that he could feel a pulse at the wrist until after the body had been placed in bed. Then, conveniently enough, the "pulse" disappeared. Such a state of affairs is not conducive to honesty, nor does it contribute much to our knowledge.

The cause of truth has suffered infinite harm from the tendency, thinly veiled by a jesting manner, of the anaesthetist to attribute fatalities to the activities of the surgeon, and vice versa. "We should not dissemble nor cloke" our sins, but "confess them with an humble, lowly, penitent and obedient heart." The Book of Common Prayer goes on to say, most appositely: "yet ought we most chiefly so to do when we assemble and meet together." . . . The object of an operation—and therefore of anaesthesia—is fulfilled if the patient can be discharged from hospital in a condition no worse than that in which he entered it. There are many disorders which cannot be cured, and often in these the death of the patient is a foregone conclusion. If, however, an operation can relieve his symptoms and render death less fearsome, it is probably justified. If anaesthesia can contribute to this it is rendering a valuable service. Surgeons and anaesthetists are, as it were, members of a team whose object is to win the match. One particular player may be instrumental in losing the match, but the entire team shares in the sensation of defeat. We are still, however, an undisciplined team for each tries to shift the blame to the other in private conversation. In print or in public addresses recrimination is inadmissible and therefore the agent usually becomes the
scapegoat. This is as stupid as for a golfer to blame the clubs or the ball. There will be no real advance until surgeon and anaesthetist are sufficiently, in St. Paul's excellent phrase, "members one of another" that each feels deeply for the other's troubles. As the principal members of the team they must learn to act jointly, not severally. Their first concern should be to determine how many patients have been operated upon, and of those how many did not survive to be discharged from hospital. Then they should consider what caused the death of the patient and discuss how, in similar circumstances, a repetition of the death can be avoided.

I propose to state dogmatically certain definitions, in the hope of being more exact in the course of this essay. The "gross mortality" of surgical interventions is the number of patients who did not survive to be discharged from hospital or to be operated upon again. It is sometimes referred to as the "case mortality" or "mortality to discharge." By "immediate mortality" the anaesthetist should mean the number of patients who died before recovering consciousness after anaesthesia. This is sometimes difficult to determine. If a patient was unconscious before operation we may reasonably assume that he should not be placed in the "immediate" category if unconsciousness receded to the pre-operative level before death. In every case in which consciousness is not regained the anaesthetic must be held to have contributed to the death unless the contrary can be shown.

It is obvious that the immediate mortality of operations depends mainly on the nature of the operation and the condition of the patient before it. The desperately ill or moribund patient is, fortunately, rarely encountered in the course of general practice. If he is, his treatment almost invariably takes place in a general hospital. For this reason deaths during anaesthesia and operation should be uncommon in the experience of the general practitioner. If we are to obtain a fair view of the frequency of this accident it is to the records of the large general hospitals that we must look. Specialised institutions will provide an unfair picture in one or other direction. Institutions devoted to genito-urinary or neurological surgery will have a higher incidence of "death on the
table" than ones which practise orthopaedics or oto-laryngology only. Helen Lukis brings out this point well by giving the details of a series of 5,138 administrations of anaesthesia. About half of these were for serious operations in a hospital: the other half were for minor operations performed in the course of general practice. Of 2,966 administrations in hospital, three were to patients who failed to recover from the operation. This means an "immediate" mortality of .101 per cent. It may be that a fourth case should be included: that of a patient who did not recover consciousness after the removal of a cerebellar tumour. On the other hand this patient may already have been in coma before the operation began. The author also records a series of 2,172 administrations in the course of a general practice. One patient died on the table from "status lymphaticus." In this series, then, the "immediate mortality" was .046 per cent; and this is less than half the figure for the major procedures undertaken in hospital.

It often happens that authors of letters to the medical journals will refer to certain cases in their own practice. Rarely, however, do they mention the total number of administrations in the course of which the deaths have occurred. For this reason their figures are of no value for statistical purposes. Such is the case with the interesting notes of Elam.

A controversy about "complacency in anaesthesia" has recently been raging in the pages of the British Medical Journal. In its course the question of the safety of anaesthetics has arisen several times. Amazingly enough, some of the participants have not considered the above factors. It is evident that operations such as tonsillectomy and herniorrhaphy should carry a very low mortality in patients otherwise healthy. These figures cannot justly be compared with those for thyroidectomy or gastrectomy in subjects who are usually poor risks. The latter cases fall to the lot of the large general hospitals; the former to the general practitioner.

Death During Anaesthesia

IMMEDIATE MORTALITY

A "death on the table" is the bugbear of the anaesthetist. It need not necessarily be his fault. Many surgical causes may be responsible. Haemorrhage, or a decrease in effective circulation resulting from trauma are the usual precipitating causes. If a sufficient number of operations are performed upon patients in poor condition, sooner or later one of the fatal accidents will occur during operation. It may be a coronary occlusion or a pulmonary embolism. In such a case it is impossible to state that it would not have occurred then had the patient been lying at rest in bed. There are cases on record in which, an operation having been postponed, the patient died of such a cause at the time for which the operation had been arranged. Had the operation been carried out either it or the anaesthetic would have been blamed for the death.

The serious accidents of anaesthesia are usually sudden and often fatal. Our knowledge and mechanical aptitude have reached a point at which the function of respiration, vital as it is, is under the control of a skilled anaesthetist. A few years ago cessation of voluntary respiration in an anaesthetised patient was a sign of grave import. Nowadays, in certain circumstances, it is viewed with equanimity, and a skilled anaesthetist often produces apnoea deliberately for certain purposes. In the broadest sense the modern anaesthetist has "taken control of respiration." The function of circulation, however, remains its own master. If the myocardium ceases to discharge its function or the peripheral vessels undergo an alteration in tonus we are as helpless as ever. We are taught by the pharmacologists that certain drugs have a beneficial and others a harmful effect on the circulatory system. Of the causes of anoxia, which is the ultimate cause of all death, we can control those which arise from the process of "external" respiration. When "internal" respiration or circulation fails, little can be done. At best we can only apply "supportive measures" in good time.

In the practice of a large institution it frequently happens that a patient is admitted moribund. Sometimes the patient has neglected his own symptoms; sometimes his medical attendant has failed to reach a diagnosis. When the condi-
tion is surgical it is sometimes the case that in operative intervention lies the patient's only hope of recovery—a faint one at best. The services of an anaesthetist are therefore requested. It is perhaps natural that surgeons and anaesthetists are both reluctant to deal with such a situation: the chance of recovery is remote and the probability of death during operation is great. Nevertheless, if operation holds out the only reasonable hope of recovery and we are afraid to undertake it, we are guilty of professional cowardice and we are putting our professional pride before the welfare of the patient. If the anaesthetist thinks that the patient may die during the operation, it is his duty to make that prognosis known to the surgeon. If, in spite of this, the surgeon still feels that the case is hopeless without operation, we are not justified in trying to avoid anaesthetising that patient. The anaesthetist will, however, be wise to have a word with the patient's relatives. He will explain to them his opinion of the gravity of the case and the necessity for operation. By the exercise of a little tact it is possible to be considerate of their feelings and yet leave them in no doubt that death may occur during the operation. Such an interview is a strain which we all try to avoid, but to do so is unwise. If, after it, the patient does die the relatives are prepared and the news is not such a shock because they were aware of the possibility. If, on the other hand, the patient survives the operation, they feel relieved and pleased. Honesty is invariably the best policy.

Fifty years ago it was not unusual for the anaesthetist suddenly to ask the surgeon to "stop the operation." This may have been a reasonable request in days when both anaesthesia and major surgery were in their infancy, and the operations themselves savoured of the technique of a "snatch and grab" raid. Colour, pulse, and respiration apart, the anaesthetist had few means at his disposal of reaching a sound judgment of the patient's condition at the time, or his ability to withstand the next onslaught of the surgeon. The more carefully planned operations of to-day do not admit of a request that they be suddenly abandoned. It is futile to ask a surgeon to close the abdomen when he has undertaken a gastrectomy and the pylorus has just been divided!
It is, however, possible for him to wait for some minutes before pursuing a traumatic phase of an operation, and anaesthetists know the astonishing extent to which a patient, whose condition has been giving rise to anxiety, may recover if the trauma is arrested for a few minutes.

When we have the assistance of a chart which shows the variations in the patient's blood-pressure and pulse-rate we have no excuse for being taken unaware as to his condition. Should a sudden accident occur, we must be in a position to treat it effectively. As a rule this demands, not the cessation of the operation, but its completion in as short a time and with as little trauma as is consistent with mechanical efficiency.

On innumerable occasions a moribund patient has been successfully operated upon. He has recovered from the anaesthetic. In some rare cases he has even made a complete recovery. More often he dies, shortly after the operation, of the condition from which he is suffering. The experience of many such cases has brought me to believe that no patient is "too ill" either to be operated upon, or to be anaesthetised for the purpose—provided the anaesthetist is competent. It is, of course, true that a patient in extremis requires very little anaesthetic; and if he is in coma no anaesthesia is necessary as a rule. The ability to "temper the wind to the shorn lamb" is an important attribute of the skilled anaesthetist, for desperately ill patients cannot stand a relative overdose of an anaesthetic agent. If a patient is so near death that he "cannot" be anaesthetised, then he is too ill to stand a surgical incision. If he can, then he is well enough to tolerate a properly administered anaesthetic for the purpose. For this reason it seems doubtful whether, since he is never "in charge of the case," an anaesthetist is morally entitled to refuse his services in these circumstances. If he fulfils his professional duty and anaesthetises patients who are moribund, deaths during anaesthesia are, sooner or later, inevitable. The greater his skill and experience, however, the more proficient will he be in the gentle art of "tempering the wind. . . ." and the less often will a death during the operation be his lot.

We are concerned, then, to ascertain how many patients
may be expected to die during anaesthesia. It is only fair that we shall consider large numbers of cases in which operations of all manner of severity have been performed upon patients in different states of general health. This can only be determined by an examination of the records of large institutions. Table I shows the figures for five teaching hospitals on three different continents. Three of these results have appeared in print; the remaining two are the fruit of examination of records to which I have had access.

<table>
<thead>
<tr>
<th>Source</th>
<th>Total cases</th>
<th>Deaths during anaesthesia</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital A (10 years, 1932-42 inclusive)</td>
<td>44,894</td>
<td>47</td>
<td>0.104</td>
</tr>
<tr>
<td>Hospital B (8 years, 1930-38)</td>
<td>...</td>
<td>61,400</td>
<td>55</td>
</tr>
<tr>
<td>Hospital C (10 years)</td>
<td>...</td>
<td>51,392</td>
<td>75</td>
</tr>
<tr>
<td>Hospital D (10 years, 1923-27 and 1933-37)</td>
<td>...</td>
<td>25,692</td>
<td>51</td>
</tr>
<tr>
<td>Hospital E (15 years, 1919-34)</td>
<td>...</td>
<td>31,157</td>
<td>48</td>
</tr>
<tr>
<td>Author (10 years, 1932-42)</td>
<td>...</td>
<td>13,011</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>...</td>
<td>227,546</td>
<td>283</td>
</tr>
</tbody>
</table>

It seems reasonable to suppose that conclusions may be drawn from as many cases as these. Almost a quarter of a million cases are considered, and of these two hundred and eighty-three did not recover from the operation and anaesthetic. The mean mortality during operation was therefore 0.12 per cent: just over one case in every thousand. Of the five institutions whose records are under consideration, one shows a mean mortality during operation almost identical with that of the entire series. In it, anaesthesia is administered by medical men only, although residents, interns, and medical students are constantly being clinically instructed, and the majority of administrations are by residents in the course of training.

In "Hospital B," whose mortality during operation is below the average, anaesthesia for major operations is administered by medical men only, although residents, interns, and medical students are constantly being clinically instructed, and the majority of administrations are by residents in the course of training.

Death During Anaesthesia

It is said that "confession is good for the soul," and therefore, it is fitting that, after ten years of the administration of anaesthetics, I should recall the cases in which death has attended my efforts. During this decade I have administered, or supervised the administration of, 13,011 anaesthetics. This figure includes all administrations by medical students under my supervision in the course of seven years of teaching; but it does not include the occasions on which I have supervised or assisted an intern, resident, or any graduate medical practitioner. Seven of these patients have not survived the operation.

Case Reports

Case I. July 1932

Oesophagectomy had previously been performed in a man of about 56. The growth had recurred and had caused ulceration in the neck. The patient was extremely cachectic and had determined to commit suicide unless something was done for his relief. To enable a laryngologist to attempt a tedious and extensive excision of the ulcerating...
recurrence, the patient was anaesthetised with C2E3 mixture and ether by the open technique. Maintenance was by pharyngeal insufflation of ether and oxygen. The operation lasted for nearly two hours, and the patient, who was perspiring freely and had become more and more pale, died during it. The passage of time has obliterated exact detail from the memory, but the following facts remain. At that time an inexperienced House Surgeon, it seems probable that I maintained too great a depth of anaesthesia and failed to notice the signs which would have warned me of an impending tragedy. It is doubtful whether the pulse was carefully palpated: it was certainly not systematically counted and recorded. Unfortunately no autopsy was held.

CASE 2. MARCH 1933

An operation was undertaken for the removal of a cerebellar tumour in an otherwise healthy man of 43. Induction was with ACE mixture on an open mask. Nasal intubation was then performed by direct vision. Some epistaxis occurred, but the intubation was successful. Maintenance was with nitrous oxide and minimal ether by the semiclosed technique. The operation had been in progress for an hour and twenty-five minutes, and a chart of the blood-pressure and pulse-rate had shown no variations of note save a tachycardia during induction of 180—this, however, in a patient whose preliminary medication had consisted of gr. 1/75 of Atropine. The rate had, in the course of the operation, subsided to 120. A reading, taken at 1.10 p.m., showed pressures of 140/76 and a pulse-rate of 120. At 1.13 p.m. the patient suddenly ceased to breathe as the surgeon, who was about to open the dura, was applying the endothermy in its vicinity. There were no signs of life thereafter and it is probable that circulation failed at the same time as respiration. When withdrawn from the body the endotracheal tube was found to be partially occluded by a clot of blood which occupied about half its lumen. The post-mortem examination added nothing to our knowledge. The findings were not consistent with death from asphyxia, and the patient had a chronic basal meningitis and not a cerebellar tumour.

CASE 3, JANUARY 1934

A very large and vascular meningioma was removed from the left frontal region of a woman sixty years of age. Anaesthesia was with nitrous oxide-oxygen-ether by the semiclosed technique, blind nasal intubation having been performed. The surgeon knew that the tumour was extremely vascular and made use of the upright position of the patient to diminish bleeding. Nevertheless profuse hemorrhage took place and a donor of blood was summoned. He, however, did not arrive
for two hours because of some misunderstanding of a telephone message. By that time the blood-pressure had been 50/40 for ninety minutes and the pulse-rate, having risen to 140, was falling rapidly and was becoming more and more irregular. The transfusion was given but the patient died during its administration.

**CASE 4. MAY 1934**

A child of five was to have an appendicectomy. The appendix was perforated and general peritonitis had set in, but the child was not yet desperately ill. It was midnight, and I had just finished anaesthetising another patient, being then senior resident. Since neither the surgeon nor I considered this child very ill, it was the function of one of the house staff to anaesthetise her. He, however, was detained by another case, and, to avoid a waste of time, I performed the induction with an open ethyl chloride-ether sequence. This was uneventful, and the "full duty anaesthetist" arrived as the patient was being taken into the operating room. I described to him what had been done and entrusted the patient to him. The child was apparently in good condition and anaesthesia was of the first plane of the third stage. Apparently the operation proceeded normally; the appendix was removed and the peritoneal cavity was drained. Anaesthesia was by then fairly deep: probably of the third plane. A pharyngeal airway was in place, but no oxygen was being administered. The child's ears were slightly grey. Abruptly, as the surgeon picked up the peritoneum to sew it, respiration and circulation both ceased. The autopsy provided no explanation of the death.

**CASE 5. FEBRUARY 1935**

A man of 55 was anaesthetised with nitrous oxide-oxygen chloroform by the semiclosed technique for the drainage of an abscess in the lower lobe of the right lung. Blind nasotracheal intubation was performed. The surgeon removed a rib over the site of the abscess, and, inserting a finger, he probed violently into the pulmonary tissue in search of the abscess. Suddenly the patient developed gross cyanosis, his pupils dilated widely, his respirations ceased, and pus began to drip from the expiratory valve to the floor. The table was hastily placed in the "Trendelenburg" position, the endotracheal tube was withdrawn, and a bronchoscope was used to aspirate a large quantity of foul pus. The patient, however, was already dead: drowned by the large volume of pus released when the surgeon's manipulations ruptured the abscess. Chloroform was used in this case because the surgeon intended to use the endothermy. No autopsy was performed.

1 This case has already been described: Gillespie, N. A. *Endotracheal Anaesthesia*. Page 150. University of Wis. Pres. 1941.
CASE 6. APRIL 1937

In this case death occurred before recovery from anaesthesia, though not in the operating room. The patient was a very large, heavy man of twenty-four, on whose right ankle arthrodesis was to be performed. His weight was well over two hundred pounds, but physical examination had revealed no abnormality, and the local condition was not tuberculous. Preliminary medication had consisted of pantopon gr. 1/3 and scopolamine gr. 1/150, and anaesthesia was accomplished with open ether after an induction with ACE mixture on an open mask. Anaesthesia was conducted by a medical student under the supervision of a member of the visiting staff of anaesthetists. The task of maintaining an unobstructed airway in a patient whose neck was almost as wide as it was long and whose mandible was extremely difficult to hold forward, proved too much for the student even after a pharyngeal airway had been inserted. The staff anaesthetist therefore performed blind intubation. Maintenance of anaesthesia was uneventful, though the anaesthesia was deeper than the nature of the operation warranted. When the surgeon began to close the wound, the anaesthetist told the student to stop the administration, and to remove the endotracheal tube and substitute a pharyngeal airway at the close of operation. The staff man then went out to supervise induction in the next patient by another student. Having returned to the ward, the patient developed periodic respiration of the "Cheyne-Stokes" type. Whether this was due to pharyngeal obstruction or to some central cause is not clear. On two occasions apnoea and cyanosis occurred but were successfully treated by the house and nursing staff. On the third occasion these methods failed, and when the anaesthetist was able to leave the operating room, some forty minutes later, he found the patient dead. At autopsy an unsuspected pericardial adhesion was found.

CASE 7. SEPTEMBER 1939

A man of 57 was to undergo the removal of what had been diagnosed as a haemangioma of the scalp. Induction was by means of 199 mgm. of avertin per kilo of body-weight. The patient was then intubated orally with a cuffed tube through which maintenance was achieved with nitrous oxide and oxygen. The lesion proved to be a huge meningioma which had eroded through the skull, and when the operation had proceeded for thirty minutes gross haemorrhage was encountered. Three transfusions of about five hundred cubic centimetres were given within seventy-five minutes and still the blood-pressure remained at 60/40 and the pulse-rate at 120, for blood was lost from the head more rapidly than it could enter the vein. At this critical moment it was found that the fourth donor, who had just arrived, was incompatible with the
patient. The anaesthetist was therefore faced with a dilemma. Either he could give physiological saline, which will provide a circulating medium even if it will transport little oxygen, or he could give nothing and hope that the patient could survive until the next donor could provide his need. By now the patient was receiving oxygen only and the anaesthetist chose the safer course and continued to administer intravenous saline. Spontaneous respiration failed half an hour later, and although manual ventilation was maintained and further blood was administered an hour later, the patient did not recover.

DISCUSSION

To what extent were these deaths attributable to the operation, and to what extent to the anaesthetic? In the first two cases it seems probable that both operation and anaesthetic contributed to the death. In the first case it is likely that the patient suffered an unnecessary depth of anaesthesia because of the ineptitude of the anaesthetist. It is certain that his condition was not observed carefully. Had the anaesthesia been competent in these respects it is possible that he might have survived. On the other hand it is also possible that an operation of lesser magnitude and duration might have proved an adequate palliative.

The second case remains an enigma. It is inconceivable that a patient could be in good condition at 1-10 p.m. and yet be dead of asphyxia within three minutes without showing any abnormal signs. And the findings at autopsy support this contention. Since the obstruction of the lumen of the tube was only partial, we must seek elsewhere for the cause of sudden death. Unlikely though it may seem, the only hypothesis which can explain the facts is to suppose that, owing to some mechanical derangement, the endothermy suddenly provided an electrical shock to the vital centres in the medulla. It was being used in close proximity to them. If this is so, it is nevertheless true that the respiratory obstruction resulting from the partial blocking of the tube must have increased the patient’s difficulties and contributed to the fatal outcome.

In cases 3, 7, and 5 the death was due to the operation. In the first two it was occasioned by haemorrhage, and in the
third by the sudden release of pus when the pulmonary abscess burst. Case 3 would probably not have ended fatally had there been no misunderstanding with the donor. Judging by the rate at which haemorrhage took place in case 7 it is unlikely that, even had the fourth donor been compatible, the patient could have been saved. In both cases the anaesthetist took action promptly. The inexperience of the anaesthetist was to some extent to blame for the fatal result in case 5. It is possible that the patient might have survived if endobronchial drainage by suction had been instantly available. The anaesthetist was in ignorance of this technique at the time. So rapidly did the bronchial tree fill up, however, that the patient would probably have drowned before pus could have been evacuated.

An anaesthetist is not entitled to an opinion on matters of operative technique. Those better qualified to judge must decide whether the operations could have been modified in a way which might have prevented these catastrophes.

In cases 4 and 6 the anaesthesia and not the operation was the cause of death. As far as one can judge on the evidence of others, I believe the child died of a relative hypoxia. She was suffering from peritonitis, her temperature was 102° and she therefore needed a large amount of oxygen. Although there was no respiratory obstruction, she was sufficiently deeply anaesthetised to have a marked reduction of respiratory exchange, and no additional oxygen was being given. Had she been fully oxygenated she would probably have survived.

There is an old proverb which stresses the folly of "changing horses when crossing a stream." The feelings of both anaesthetists who participated in case 4 have taught them this lesson for life. Changes in personnel in the course of an operation cannot always be avoided, but if a tragedy occurs after a change the parties concerned are usually sorry that they did not complete the case. In the case under consideration, either the anaesthetist who performed induction should have finished the anaesthesia himself, or he should have made the surgeons wait until his relief arrived.

It would be easier to speak dogmatically as to the cause of death in case 6 if one had seen the behaviour of the patient
on his return to the ward. Descriptions by the nursing staff leave room for doubt whether the "periodic" respiration was due to recurrent respiratory obstruction or to incipient medullary failure. The anaesthetist in charge was to blame for allowing a student to take too much responsibility for a patient who was known to be difficult to manage. In view of the difficulty in maintaining a free airway the endotracheal tube should probably have been left in place until consciousness had been recovered. Instead of starting the next case the anaesthetist should have remained with the patient and should have satisfied himself that anaesthesia was light and that the freedom of the patient's airway was properly safeguarded before he left the operating room. These factors were probably of greater moment than the pericardial adhesion found at autopsy. Of these seven deaths, then, three were chiefly due to the operation and two to anaesthesia. In the remaining two, both factors probably contributed to the death.

Could these deaths have been prevented? Without discussing some modification of the operation, the anaesthetist could probably have avoided death in cases 1, 4 and 6. Lighter anaesthesia and an earlier recognition of circulatory exhaustion in case 1; lighter anaesthesia and adequate oxygenation in case 4; light anaesthesia and more careful attention to the airway in case 6 might have saved these patients. It is possible that endobronchial anaesthesia or adequate endobronchial drainage might have saved the patient in case 5. This, however, is a matter of speculation.

It is interesting to note the dates of these deaths, and to observe that the fatalities grow relatively less frequent as the experience of the individual increases. This fact of itself supports the view that, in the hands of some more experienced worker, some of these patients would not have died. It is, however, encouraging to remember that, in this series of 13,000 anaesthetics, there were about thirty patients who were not expected to survive the operation. The majority died soon afterward, but at least they recovered from anaesthesia.

Fear is a poor counsellor, and the anaesthetist must learn not to be afraid. Vainglorious self-confidence, however, is a more dangerous attribute than fear. The experienced
anæsthetist follows the via media between these extremes. He faces the facts, having done his best to ascertain and evaluate them; conscious always of the dangers, but knowing what he can do to overcome them. *Humanum est errare.* From time to time we fail, and the patient dies. None of us is omniscient, and growing experience shows us with increasing clarity how little we know. Ignorance is a pardonable sin. Laziness is not. Looking back on these tragedies the only consolation is that they were due to ignorance and not to laziness. The only unforgivable sin is being too indolent to make an extra effort.