

'A Yankee dodge': the first British public demonstration of anaesthesia

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Abstract

Following the first administration of ether as an anaesthetic in 1846, by William Morton in Boston, news travelled rapidly to London where Liston was responsible for introducing this technique to the United Kingdom. Squire wrote to the *Lancet* about his own early experiments with ether as well as anaesthetising for the initial operation at University College Hospital. We discuss this landmark case, the first demonstration of anaesthesia in Europe, and how it compares to anaesthetic agents and techniques used today.

Keywords

Robert Liston; William Squire; University College Hospital; general anaesthesia; ether.

Introduction

Prior to ether, painless surgery was viewed with suspicion by many surgeons who believed that pain was a necessary evil for recovery. Previously attempted techniques, such as nitrous oxide and mesmerism, had either failed or been discredited. For this reason it was important that such an eminent surgeon of the times as Liston was instrumental in pioneering anaesthesia. The introduction of anaesthesia has since allowed surgeons to perform operations previously thought impossible.

The first ether anaesthetic

On the 16th October 1846 Dr William T.G. Morton, after previous private experience on dental extractions, publicly administered ether to Gilbert Abbott at the Massachusetts General Hospital in Boston, 'with the alleged intention of producing insensibility to pain'^[1]. The surgeon, John C. Warren, removed a vascular tumour from Abbott's jaw and famously announced to the amazed spectators, 'Gentlemen, this is no humbug'^[2].

News spread rapidly across the Atlantic to Dr Francis Boott who on December 19th 1846 removed a molar tooth using ether anaesthesia at Gower Street, London^[3]. Boott wrote a letter of his success to Robert Liston, professor of surgery at University College London, who was widely considered to be the best surgeon of his day and was famous for his bold ideas. He believed excessive pain, caused by extended operations, to be cruel, so much so that his catchphrase was, 'Time me, gentlemen, time me'^[4].

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On 21st December 1846, at the University College Hospital, London, Squire administered anaesthesia for Liston, who introduced the technique as a 'Yankee dodge for making a man insensible to pain'^[5]. Just 28 s later Frederick Churchill's leg had been amputated^[6].

On awakening, Churchill, not knowing the operation was over, called out, 'Take me back, I can't have it done!'^[3]. Liston, turning to the audience, announced, 'Good God! Why it's better than mesmerism,'^[6], a reference to the discredited technique previously attempted at University College Hospital.

Inhalational anaesthetic agents

Inhalational anaesthetic agents are still the mainstays for the maintenance of general anaesthesia today. In Victorian times the properties required of an anaesthetic were that it was safe, non-flammable, non-irritant to the airway, had a quick onset of action and that the effects were reversed quickly.

Whilst ether has a good safety profile, it has a long wash-in and wash-out, leading to prolonged induction and emergence times; it is also irritable to the airway making inhalational induction difficult due to breath holding and coughing. Other side effects include post-operative nausea and vomiting in up to half of patients and excessive salivation requiring pre-medication. Ether is also highly flammable which was of particular relevance in Victorian times when operations often took place in candlelight. These problems allowed for the introduction of chloroform, which was thought to be a far more suitable replacement.

Chloroform was first described by Sir James Simpson in 1847, the year after ether became available. It was a worldwide sensation, gaining instant respectability after Dr John Snow administered chloroform to Queen Victoria for the birth of Prince Leopold in 1853 following which it became known as '*anaesthésia à la reine*'. The reason it gained popularity was due to the rapid onset of action, the degree of muscle relaxation obtained and the relative non-flammability as compared to ether. However chloroform fell out of favour in the 1870s because of an unacceptably high mortality rate due to its narrow therapeutic index. This led to a resurgence of ether anaesthesia, particularly when used with nitrous oxide^[7].

In 1956 the first of the modern anaesthetics, halothane, became available. It was safe to administer, non-flammable and non-irritable to the airway. Although halothane sensitises the heart to catecholamines, causing a high incidence of cardiac arrhythmias, the main reason for the reduction in its use was the rare incidence of halothane hepatitis. Halothane is still widely used throughout the developing world.

Anaesthetic agents currently used in Britain are mainly the halogenated ethers isoflurane, sevoflurane and desflurane. Isoflurane is rapidly absorbed in blood, is potent and has few major side effects. Sevoflurane has advantages in that it has a quicker onset and offset of action whilst its airway non-irritability allows it to be used for inhalational inductions unlike isoflurane and desflurane which are highly irritant. Desflurane, however, is extremely rapidly removed from the lungs, due to its low oil-gas partition coefficient, making it ideal for prolonged operations requiring rapid emergence.

Mortality from anaesthesia

Prior to anaesthesia, operations were not lightly undertaken, often only performed in extreme situations. No formal mortality figures were kept although there is anecdotal evidence that in one of Liston's cases there was a 300% mortality rate: the patient (from sepsis), the assistant (from sepsis, following his fingers being accidentally amputated), and an observer (attributed to shock after believing that he had received an incision when his clothes were cut)!

Following the introduction of ether, Squire commented that 'the problem was no longer in how short a time can an operation be performed, but for how long can anaesthesia be safely and easily maintained'^[5]. Less than 3 months after its introduction, a 21-year-old girl called Ann Parkinson became the first death wholly attributed to an anaesthetic. Concern with deaths from anaesthesia increased after the introduction of chloroform, especially as the patients dying were often previously fit and well. Studies showed that the mortality rate from ether was approximately 1 in 25 000 whereas chloroform's was as high as 1 in 2500^[7].

In the modern era regular national audits of mortality take place, and University College London hospitals currently have a standardised mortality rate of 65.3^[8]. Intra-operative deaths are rare, estimated to be around 1–30 per 100 000 cases, with deaths directly related to anaesthesia around 0.25–0.4 per 100 000 cases. Only 12% of deaths are unexpected^[9]. Causes of death are annually

reviewed by the National Confidential Enquiry into Patient Outcome and Death (NCEPOD)^[10] but mortality is far more likely to be due to the poor physiology of the patient and to far more demanding surgery than solely to the anaesthetic.

Conclusion

Prior to general anaesthesia, there had been much debate as to how to perform painless surgery, many surgeons believing that it was not possible. However, just over 150 years after Liston and Squire's landmark first operative anaesthetic in 1846, there are now more than 5 million anaesthetics given annually in the United Kingdom alone^[9].

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