1 History of anaesthesia

Figure 1.1 Timeline

Year	Event
1772	– Nitrous oxide (N_2O) described and synthesized by Joseph Priestly
1798	– Humphrey Davy used N_2O experimentally
1844	– Horace Wells performed the first public demonstration of N_2O in December 1844
1863	– N_2O entered general dental practice
1846	– William Morton used ether at Massachusetts General Hospital, Boston in October 1846. Dr Oliver Holmes, who was present, described the state induced by ether as 'anaesthesia'
1846	– Ether used in Dumfries and London
1847	– James Simpson introduced chloroform
1853	– John Snow administered chloroform to Queen Victoria during the birth of Prince Leopold – Joseph Clover developed anaesthesia as a medical specialty – Chloroform was replaced due to its toxicity
1884	– Carl Koller described the use of topical cocaine
1884	– William Halstead and Richard Hall injected local anaesthetic into tissue and nerves
1885	– Leonard Corning described spinal anaesthesia in dogs
1885	– Walter Essex Wyntner and Heinrich Quincke independently described dural puncture
1899	– Gustav Bier performed spinal anaesthesia
1902	– Henry Cushing described regional anaesthesia
1907	– Continuous spinal anaesthesia described
1921	– Fidel Pagés Miravé (a Spanish surgeon)described epidural anaesthesia
1920s	– Intubation of the larynx developed
1935	– Ralph Waters and John Lundy independently used thiopentone as an intravenous induction agent
1942	– Neuromuscular blocking drugs first used in surgical operations by Harold Griffith and Enid Johnson
1949	– Martinez Curbelo (Cuba) administered the first continuous epidural anaesthetic (continuous spinal anaesthesia had originally been described in 1907)
1950s	– Halothane introduced: its smooth induction, pleasant smell and potency proved advantageous. It needed new vaporizer technology, allowing more accurate dose administration
1977	– Propofol introduced as an induction agent, allowing smooth induction and rapid recovery with minimal hangover effect
1980s	– Laryngeal Mask Airway (LMA) introduced by British anaesthetist Archie Brain, resulting in a marked reduction in the number of patients being intubated during anaesthesia. It has since become a key aid in patients who are difficult to intubate as well as rescue techniques when failure to intubate and/or ventilate a patient occurs
1948	– The Faculty of Anaesthetists of the Royal College of Surgeons founded
1988	– The College of Anaesthetists founded as part of the Royal College of Surgeons
1992	– Royal Charter granted to the Royal College of Anaesthetists

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Before the introduction of anaesthesia, it would not have been possible to carry out the majority of modern operations. Development of the triad of hypnosis, analgesia and muscle relaxation has enabled surgery to be performed that would otherwise be inconceivable.

Early attempts at pain reduction included the use of opium (described in Homer's Odyssey 700 BC), alcohol and coca leaves (these were chewed by Inca shamans and their saliva used for its local anaesthetic effect).

Attempts at relieving childbirth pain could (and did) result in accusations of witchcraft.

If surgery had to be performed, it usually involved restraint, administration of alcohol and the procedure being performed as quickly as possible (amputations often took a matter of seconds).

Nitrous oxide (N_2O) was described and first synthesized by Joseph Priestly in 1772. It was used experimentally by Humphry Davy, who also introduced its use to London intellectuals at the time, such as the poet Samuel Taylor Coleridge, engineer James Watt and potter Josiah Wedgewood. Priestly also discovered oxygen, describing it as 'dephlogisticated air'.

First documented anaesthetic

The first *documented* use of N_2O was in North America, by Horace Wells (a dentist) in Hartford, Connecticut in December 1844, for a dental extraction in front of a medical audience. The patient cried out during the procedure (although later denied feeling any pain) and Wells was discredited, never to fully recover and eventually committing suicide.

N_2O subsequently entered general dental practice in 1863.

Ether and chloroform

In October 1846, William Morton (also a dentist) used ether at the Massachusetts General Hospital, Boston during an operation on a neck tumour, performed by surgeon John Warren. Dr Oliver Holmes, who was present, described the state induced by ether as 'anaesthesia'.

On 19th December 1846, ether was used in Dumfries (during a limb amputation of a patient who had been run over by a cart) and in London (for a tooth extraction).

James Simpson (Professor of Obstetrics in Edinburgh) introduced chloroform in November 1847, having discovered its effectiveness at a dinner party held at his house on 4th November that year.

John Snow administered chloroform to Queen Victoria during the birth of Prince Leopold *(chloroform a la reine)*. Her positive endorsement of pain relief during labour removed religious objections to the practice at that time. (Snow is also famous for his epidemiological work, which identified the Broad Street water pump as the source of a cholera epidemic in London in 1854, confirming it as a water-borne disease.)

Chloroform was later replaced due to its toxicity and potential to cause fatal cardiac dysrhythmias.

Anaesthesia as a medical specialty

The development of anaesthesia as a specialty has been attributed to Joseph Clover. He advocated examining the patient before giving an anaesthetic as well as palpating a pulse throughout the duration of anaesthesia. He described cricothrotomy as a means of treating airway obstruction during 'chloroform asphyxia'.

The development and use of local anaesthetics

Carl Koller (an ophthalmologist from Vienna) described the use of topical cocaine for analgesia of the eye in 1884, having been given a sample by his friend Sigmund Freud (the founder of modern-day psychoanalysis) who worked in the same hospital.

In 1884, William Halstead and Richard Hall, in New York, injected local anaesthetic into tissue and nerves to produce analgesia for surgery. The following year, also in New York, Leonard Corning, a neurologist, described cocaine spinal anaesthesia in dogs; he had inadvertently performed an epidural block. Six months later, Walter Essex Wyntner in the UK and Heinrich Quincke in Germany independently described dural puncture (this was used for the treatment of hydrocephalus secondary to tubercular meningitis).

In 1899, Gustav Bier performed spinal anaesthesia on six patients as well as on his assistant – who also performed the same procedure on Bier. They tested the efficacy of the anaesthetic on each other with lit cigars and hammers. Both reported significant post dural puncture headache, which at the time they attributed to too much alcohol consumed in celebration of their achievement. He also described intravenous regional anaesthesia (IVRA), in which local anaesthetic is injected intravenously (usually prilocaine) in a limb vein, with proximal spread prevented by a tourniquet – the Bier's block.

In 1902, Henry Cushing described regional anaesthesia (blocking large nerve plexi under direct vision in patients receiving a general anaesthetic).

The Spanish surgeon Fidel Pagés Miravé described epidural anaesthesia for surgery in 1921.

Typical career path in anaesthesia

- Medical School: 5–6 years;
- Foundation Programme: 2 years;
- Anaesthetic Training Programme or Acute Care Common Stem Training (ACCS; 2 years) consisting of 1 year of anaesthesia/intensive care medicine (ICM) and 1 year of acute and emergency medicine. If an ACCS trainee wants to continue in anaesthetic training they will enter year 2 of basic level training;
- Basic level training: 2 years (21 months of anaesthesia and 3 months of ICM);
- Pass the Primary Fellowship of the Royal College of Anaesthetists (FRCA) examination;
- Intermediate level training: 2 years;
- Pass the Final FRCA examination;
- Higher level training: 2 years;
- Advanced level training: 1 year.

Throughout all levels of training, summative assessments are carried out to ensure standards are achieved, with increasing responsibility and the opportunity for subspecialization in the more advanced years of training, for example paediatrics, obstetrics, cardiac, intensive care and pain management.

Useful links

Royal College of Anaesthetists: www.rcoa.ac.uk

Association of Anaesthetists of Great Britain and Ireland: www.aagbi.org