The History of Anaesthesia

As a dental student in the mid-sixties I attended the ‘gas sessions’. All we had was nitrous oxide. Senior anaesthetists, for whom dental gassing was perhaps something of a chore, would apply the rubber mask to the face and turn on the 100% nitrous oxide to achieve anaesthesia quickly. As the patient went blue, they would introduce the oxygen and we were ready to start.

Not all anaesthetists were so cavalier about depriving the patients of oxygen but there was a logic in their approach.

There were no fast-acting barbiturates or other injectable agents to achieve a smooth loss of consciousness.

The nitrous oxide was quite slow and the patient passed through stages to reach the state of insensibility. One stage was excitation. In this phase, the patient could often flail about like a person possessed and, if he or she was very strong, injuries could be inflicted on nearby staff.

Yet once in the excitement phase, he roared a stood up lifting the dental chair with him and he walked across the room carrying it. I only ever saw that once but I gained a new respect for the might of the dockworker that day.

I shall carry to my grave the image of a bull-necked, eighteen-stone extremely muscular London dock worker, sitting in the dental chair in the gas room at Guys and being given the nitrous oxide. When he reached excitation, his strength and reaction was prodigious. His arms were strapped to the chair, which weighed nearly 2½ hundredweight to stop him injuring himself (and us!).

For that reason, there were often eight or more staff and students in the ‘gas room’ to hold the patients down whilst they passed through the phase.

Sorry, I have rambled!

Anaesthesia is a word derived from the Greek meaning “without sensation” and is a state where loss of sensation or awareness is induced, controlled and maintained to allow medical procedures which might otherwise be impossible or distressing and limited by pain. Anaesthesia may include analgesia, the relief of pain or preventing it from developing; paralysis and unconsciousness. Most anaesthetics also generate amnesia, which is the loss of
memory during the procedure and in the immediate post-anaesthetic period.

The thought of anaesthesia has been a concept and an aspiration since the time of the Egyptians and a variety of techniques were used to eliminate the pain associated with surgical procedures.

Early societies were aware of the pain-deadening qualities of opium, hashish or Indian hemp, and alcohol. In the first century AD, the Greek naturalist Dioscorides suggested that the root of the mandrake plant steeped in wine should be given to a patient about to undergo surgery.

Dioscorides was an innovative naturalist who described a host of medications. Amazingly historian Charles Singer found that forty-four of the drugs he named survived to appear in twentieth century pharmacopoeias.

Most patients before the ascent to the throne of Queen Victoria did, however, have to cope with the prospect of surgery, sometimes serious with little if any treatment to deaden the pain.

It was felt by many surgeons that a deeply drugged or drunk patient could be much more difficult to manage than an alert one suffering acute pain (I'll leave you to be the judge of that).

In general, few operations were possible apart from drainage of pus and cutting off lumps, patients had to be tied to the table, and surgery was an extremely painful procedure which was always a last resort.

Things changed in the nineteenth century, with the arrival of ether. Amazingly it had first been synthesised in the thirteenth century and the compound (diethyl ether) was reported to have soporific and analgesic effects. However, it was not until the late eighteenth century that nitrous oxide was discovered by Joseph Priestley (1772) but it was slow to be taken up despite Humphrey Davy suggesting in the 1790s that it could be used for surgical procedures.

He coined the phrase ‘laughing gas’ because of the tendency of the patient to laugh when it was administered.

Michael Faraday, working at the Royal Institution in London, studied ether in detail and too recognised its effects about which he published in 1818.

In 1842, dentist William Clarke in New York attempted tooth extraction under ether.

Another American dentist, Horace Wells, suggested using nitrous oxide and had one of his own teeth extracted painlessly in 1844. However, in 1846, Boston dentist William Morton acted as anaesthetist for John Collins, professor of surgery at Massachusetts General Hospital in Boston and, as the re-creation pictured shows, a young man had a tumour removed from his neck. The patient, Gilbert Abbot, recovered.
Word spread quickly about this huge advance and it was reported that, in 1846, a dentist extracted a tooth using ether in Dumfries and Dr Francis Boott, an American, anaesthetised a woman for a tooth extraction in London.

The latter procedure was done in the presence of the London Surgeon, Robert Liston, who subsequently amputated the diseased thigh of a patient using ether and called the technique “The Yankee Dodge” also in 1846.

The following year, in 1847, James Simpson of Edinburgh used chloroform for the first time to relieve pains of childbirth, later used extensively for obstetric patients, including for Queen Victoria.

For the next few years, anaesthesia was gradually introduced into surgical practice although it was quite slow and was punctuated by some deaths which perhaps slowed progress.

In London Dr John Snow developed skill and expertise and published some of the earliest instructional literature. He administered chloroform to Queen Victoria in 1853 and to Princess Beatrice in 1857.

The fact that anaesthesia was being used for members of the Royal family stopped the murmurings about the risks of anaesthesia and its use mushroomed.

Nitrous oxide was popular but it was used without oxygen making it suitable for only the briefest of procedures such as dental extractions. Furthermore, nitrous oxide had to be manufactured where it was used because the technicalities of storing the gas in cylinders, which would not be invented for many years. This limited its usefulness.

Simpson, who pioneered the chloroform in 1847, also recognised the value of local anaesthetic. He proposed cooling which led to the invention of the ether spray and the technique called ‘freezing’.

A similar agent, ethyl chloride, is still used today for numbing local areas of skin, often to incise an abscess.

The numbing effects of cocaine were first described in the 1860s and, in 1884, in Vienna, Sigmund Freud investigated its effects with colleague, Carl Koller.

So, nitrous oxide, ether and chloroform were all available and recognised and the cartoon shows the accidents occurring with chloroform. The use of these agents in surgery was limited because of a key complication; infection.

This was to be overcome through the work of Joseph Lister and his development of antiseptics and the introduction of the carbolic spray in operating theatres in the early 1880s. That too encountered considerable resistance largely because surgeons disliked the smell and messiness of the spray. However, the technique was
refined and, with improving anaesthetic
techniques, surgery blossomed.

Gradually the use of general anaesthesia
progressed in parallel to improvements in
surgical technique.

**Improvements continued more rapidly
with war and the necessity to operate on
servicemen injured in battle.**

Many had abdominal and chest wounds and
the technical difficulty of operating in
those areas was increased by the tightness
of the muscles.

The problem was eventually overcome
through recognition of the effectiveness of
the South American arrow-tipping poison,
curare. The drug produced muscle paralysis
and therefore relaxation.

The drug was introduced into anaesthetic
practice in 1942 by Johnson and Griffith in
Montreal. The muscles were relaxed and
therefore, less anaesthetic was needed
simply to retain the patient unconscious.
Of course it was important to ensure that
the anaesthetist oversaw the ventilation of
the patient because the drug paralysed the
diaphragm and chest muscles and so,
without adequate artificial ventilation, the
patient would die of asphyxia.

Eight years earlier, in 1934, another major
step forward occurred with the
introduction of Pentothal, a fast-acting
intravenous barbiturate which could induce
anaesthesia in seconds rather than the
minutes often required for an inhalation
technique. The induction of anaesthesia
was therefore much smoother and patients
felt much more relaxed with the simple
‘scratch in the arm’ rather than a rubber
mask clamped over the face. However, the
more rapid induction demanded improved
skills and knowledge on the part of the
anaesthetists, necessary to minimise the
morbidity and mortality which occurred as
a result of anaesthetic, as well as of
surgical complications.

Anaesthetic skills were intimately entwined
with intensive care and that the patients
who were taken to intensive care units
needed the skills of the anaesthetist to
manage the cardiac or respiratory failure
which so often accompanied serious illness.

In 1948, the first modern local
anaesthetic, lignocaine was introduced
and it still remains in use to this day.

Local anaesthetic can be infiltrated into an
area to produce numbness but it can also
be directed to anaesthetise a nerve thus
producing numbness and paralysis in the
area and muscles served by that nerve.

The use of nerve blocks rapidly developed
and expanded beyond anaesthesia to many
other medical specialities where it has
become a valuable tool for managing a
wide range of chronic and acute conditions
and for achieving pain relief.

GPs with an interest in anaesthesia had
been in the vanguard of the development
of the skills but, with increased
complexity, there was the necessity for
improved, reproducible, recognised skills
to be created, agreed and taught to the
next generation of anaesthetists.

Lord Nuffield endowed the first Academic
Department of Anaesthesia in Oxford in
1937. The first director of department was
Professor Sir Robert McIntosh.
The College of Anaesthetists, originally part of the Royal College of Surgeons but now independent, developed and with it came increased learning and examinations in anaesthetics to demonstrate that expertise.

Formal training started in 1935 with the award of the Diploma in Anaesthetics. Later the Fellowship examination became the standard for those wishing to pursue a career in anaesthetics.

Many of the drugs which formed such a central part of early anaesthetics have now passed into history but the drugs of today are, in many cases simply modifications or refinements of those original agents.

Anaesthetics now has a prodigious success rate, for two reasons; because of the high standard of training that now occurs and because of the amazing equipment which supports the procedures in anaesthesia.

Indeed, my son is an anaesthetist at a large teaching hospital and he always says that patients are safer when anaesthetised and under his control than they are before they are rendered unconscious or after they have recovered consciousness.

Quite a thought, eh!

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