Michael Tunstall
Innovative obstetric anaesthetist responsible for Entonox

As recently as 50 years ago the adequacy of pain control in childbirth could still be something of a hit or miss affair. That things began to improve in the 1960s owes much to the ingenuity and persistence of Michael Tunstall, an unassuming specialist in obstetric anaesthesia whose name is less familiar than it deserves to be. It was his determination that gave medicine the half and half mixture of the gases nitrous oxide and oxygen, generally known by its tradename Entonox.

Before the advent of Entonox, pain relief in labour was mostly by nitrous oxide mixed with 50% air. This, according to Felicity Reynolds, emeritus professor of obstetric anaesthesia at St Thomas’ Hospital in London, was unsatisfactory. “Even when the equipment was working properly you only got 10% oxygen. But often it didn’t work well, and you might get too much air and not enough pain relief. Or too much nitrous oxide and even less oxygen.”

“Poynting” out a solution
The obvious remedy, a pressurised cylinder of premixed nitrous oxide and oxygen, was viewed as unfeasible. Oxygen in cylinders is normally a gas; nitrous oxide at the same pressure liquefies. The manufacturer of medical gases the British Oxygen Company (now BOC), said that it wasn’t practicable to mix them in one cylinder, but Tunstall wasn’t convinced. He showed that bubbling oxygen through liquid nitrous oxide could generate a mixture of the two in gaseous form. BOC should have known this was possible because the phenomenon had been described many years earlier by the English physicist John Henry Poynting, who died in 1914, and he’d even given his name to it: the Poynting effect.

Persuaded that this was a commercially viable innovation, BOC patented the process, called the gas Entonox, and began to market it. Tunstall himself earned nothing from his endeavours. Although it’s Entonox for which Tunstall will be remembered, it was just one of a string of ideas and inventions. Fiona Knox, now retired from obstetric anaesthesia, came to work with him at Aberdeen Maternity Hospital in 1976. She recalls encountering another of his brainwaves. “When I walked into the theatre for the first time at the hospital I found the anaesthetist Tunstall speaking to his apparently unconscious patient. It was like a séance. He was saying, ‘Squeeze my hand if you can hear me.’ He seemed to be having a conversation.”

What he was actually doing was checking whether his patient was unconscious. The advent of muscle relaxant drugs for use during surgery had enabled anaesthetists to administer smaller amounts of anaesthetic. But with this went the risk of misjudging the dose and allowing patients to drift back into a state of awareness, in which they would be unable to communicate on account of their muscular paralysis. Tunstall came up with the idea of using an inflated cuff for measuring blood pressure to act as a tourniquet that would prevent the paralysing drug entering one forearm, leaving one part of the body with which patients could signal awareness. The isolated forearm technique, as it was known, was a useful research tool, especially in assessing new anaesthetic agents.

Plenty of anaesthetists had noticed how a blood pressure cuff could interfere with the entry of muscle relaxing drugs into the forearm, and so permit movement, said Knox. But only Tunstall saw how to exploit it for communicating with people who were otherwise paralysed. “He would see things from a completely different point of view, and, if they were useful, use them,” she said. Tunstall’s many innovations, which included the first “failed intubation drill,” a procedure to help anaesthetistscope with what can be a panic inducing experience, won him the gold medal of the Obstetric Anaesthetists’ Association.

Tunstall’s impact went beyond anaesthesia. In the 1960s positive pressure ventilation was felt to be unsuitable for neonates, said George Russell, emeritus professor of child health at the University of Aberdeen. Tunstall doubted this, and decided to find out. “We had to find a baby that was clearly going to die if left to its own devices,” Russell recalls. Such a baby finally turned up, and the parents agreed that the ventilation technique could be tried. “The agreement was that even if the baby improved we wouldn’t try to keep it alive because it would already be brain damaged.” After ventilation the baby did improve; it was clear that the technique was working.

Tunstall compiled a case series and subsequently organised a trial that compared ventilation with non-ventilation. Once again he’d shown that wasn’t prepared to accept conventional wisdom; he wanted to test it.

Tea estate in Assam
Born on a tea estate in Assam, India, on 23 June 1928, Tunstall did not arrive in the United Kingdom until he was 8 years old. On graduating in medicine he did two years of military service before enrolling as a trainee general practitioner. His aim was to combine general practice with a special interest in obstetrics and anaesthesia. On realising that this was impracticable he switched back to hospital medicine and began his anaesthetics career. Via Portsmouth, London, and Oxford he reached Aberdeen, becoming a consultant there in 1962.

Knox describes him as a gentle and compassionate man, not only to patients but to trainees. “Very quiet, unassuming and modest,” added Reynolds. Tunstall leaves a wife and three children. A street is to be named after him in his home village of Newtonhill near Aberdeen.

Geoff Watts
Michael Eric Tunstall, anaesthetist (b 1928; q UCH Medical School, London, 1952), died from cancer on 21 April 2011.

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