Brian Sellick, Cricoid Pressure and the Sellick Manoeuvre

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The induction of anaesthesia using either an intravenous barbiturate and muscle relaxant technique or an inhalational agent with a short-acting muscle relaxant are both fraught with the risk of regurgitation of stomach contents followed by pulmonary aspiration. Brian Sellick, an anaesthetist at the Middlesex Hospital, London, studied a potentially simple method of avoiding this regurgitation in the cadaver.

The manoeuvre consists in temporary occlusion of the upper end of the oesophagus by backward pressure of the cricoid cartilage against the bodies of the cervical vertebrae. In the cadaver it was found that when the stomach was filled with water and firm pressure was applied to the cricoid, as described below, a steep Trendelenburg tilt did not cause regurgitation of fluid into the pharynx. Moreover, the flow of water from the pharynx could be controlled by varying the pressure on the cricoid cartilage [1].

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Fig. 1. Brian Arthur Sellick 1918–1996 (reproduced with permission of the Association of Anaesthetists of Great Britain and Ireland).

Fig. 2. The Lancet 1961;2:404 (reproduced with permission).

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The problem of regurgitation of acid stomach contents into the lungs was particularly dramatic in obstetric anaesthesia. The New York obstetrician, Curtis Mendelson, in a review of all cases at the New York Lying-in Hospital from 1932 to 1945 found an incidence of 1.5 per 1000 deliveries [2,3]. Acid aspiration, or Mendelson’s syndrome as it came to be called, was a major cause of maternal death in the middle of the 20th century [4].

The anatomical rationale for Sellick’s manoeuvre had previously been put forward previously by John Hunter in 1776 in his article *Proposals for the recovery of people apparently drowned* [5]. The essence of Hunter’s treatment was ‘blowing air into the lungs’. To ensure that air went into the lungs and not into the stomach he proposed the following: [5].

If during this operation the larynx be gently pressed against the oesophagus and spine, it will prevent the stomach and intestines being too much distended by the air, and leave room for the application of more effectual stimuli to those parts. This pressure, however, must be conducted with judgement and caution so that the trachea and the apparatus into the larynx may both be left perfectly free.

Sellick did not refer to Hunter’s work so we do not know whether his own manoeuvre, aimed at preventing the opposite flow, from stomach to the airways, was inspired by Hunter’s publication. As reported by Wilkinson [6], others, however, had noted Hunter’s work. Charles Kite, of Gravesend in Kent, had noted that tracheal intubation was not a particularly easy technique but a nasal airway in conjunction with cricoid pressure was very effective [7]. James Curry, a general practitioner from Northampton, had formed his own society to “promote recovery from a state of apparent death” and had published a book on the subject which ran to two editions [8,9]. In these volumes his principle mission was to attempt to define the point of futility in attempting resuscitation but he also mentions the benefit of cricoid pressure in assisting with tracheal intubation so as to be able to administer the recently discovered “pure air or oxygen as the French chemists now call it [6]”. Sellick’s description was simple and precise: [1].

During induction, the patient lies supine with a slight head-down tilt. The head and neck are fully extended (as in the position for tonsillectomy). This increases the anterior convexity of the cervical spine, stretches the oesophagus, and prevents its lateral displacement when pressure is applied to the cricoid...Cricoid pressure must be exerted by an assistant. The nurse or midwife accompanying the patient can be shown in a few seconds how to do it. Before induction the cricoid is palpated and lightly held between the thumb and the second finger; as anaesthesia begins, pressure is exerted on the cricoid cartilage mainly by the index finger. Even a conscious patient can tolerate moderate pressure without discomfort; but, as soon as consciousness is lost, firm pressure can be applied without obstruction of the patient’s airway. Pressure is maintained until intubation and inflation of the cuff of the endotracheal tube is completed......During cricoid pressure the lungs may be ventilated by intermittent positive-pressure without risk of gastric distention.

Sellick’s manoeuvre has been adopted world wide in anaesthetic circles to reduce the risk of gastric regurgitation and pulmonary aspiration during rapid sequence induction of anaesthesia. The benefits are also clear during the resuscitation process and the technique has been advocated in airway management during resuscitation, including the most recent international guidelines, both to prevent gastric regurgitation and pulmonary aspiration, and to facilitate tracheal intubation [10].

Brian Arthur Sellick was born in Dorking, Surrey in 1918. A rugby football player of some note at school and medical school, he qualified in medicine from the Middlesex Hospital London in 1941. He went immediately into anaesthesia where there was a huge emergency workload arising from injuries inflicted by the Blitzkrieg on London. When asked how they coped with the phenomenal number of cases Brian replied “Well, the surgeons were much quicker in those days”.

He was promoted to senior resident in anaesthesia at the Middlesex in 1942, passing the Diploma in Anaesthesia at the Royal College of Surgeons a year later. After service in the Royal Navy in the Oriental and Australian waters from 1944–1946, he returned to civilian life and was appointed as a member of the Honorary Consultant Anaesthetic Staff of the Middlesex Hospital and soon afterwards to Harefield Hospital and the Royal Masonic Hospital, also in London.
These posts did not carry any salary until the introduction of the National Health Service in 1948, so he also gave anaesthetics at the King Edward VIIth Hospital for Officers and at various sanatoria treating the epidemic of tuberculosis that followed the war [11,12]. Specialising initially in thoracic anaesthesia, he became drawn into cardiac anaesthesia in its very early days. He was impressed with the potential of hypothermia to allow a period of safe cardiac arrest to permit open heart surgery for relatively simple procedures such as repair of atrial secundum defects and correction of pulmonary and mitral stenosis. The technique of surface cooling to a core temperature of 30 °C, using ether and tubocurarine, that he developed after a visit to Swan and his colleagues at the University of Colorado proved to be highly effective. In his landmark paper, published in 1957, he reported the successful management of 32 cases without loss [13]. Ultimately the team at the Middlesex Hospital, using this technique, operated on over 400 patients with atrial secundum defects with only one death [11].

Brian Sellick took a very active role in the early days of academic anaesthesia at the Royal Society of Medicine and the Faculty (later to become the Royal College) of Anaesthetists, serving as Vice Dean there from 1972–1974. He received the Henry Hill Hickman Medal of the Royal Society of Medicine for his work on cricoid pressure. In the citation for that honour it was stated –.

“It is impossible to overestimate the benefit that this discovery has made to the safe conduct of anaesthesia, as it has undoubtedly saved many patients from serious post operative complications or death. Thirty years (now 43) years after its presentation, the technique is still in use worldwide and has not been superseded by any other solution [11].”

Sellick’s great contribution was also recognized by the award of the Gold Medal of the Royal College of Anaesthetists in 1989.

In his retirement in Devon in the southwest of England, he became chairman of the local conservation society, enjoyed the theatre and concerts and worked hard in his garden and at woodwork. He married Florence in 1943; they had three sons and ten grandchildren. He died suddenly in 1996 in his woodwork workshop.

“He was a happy and fulfilled man with a great sense of humour whose ready laughter was always full of glee” – so wrote Bill Pallister in his obituary of Brian Sellick [11].

On a personal note, one of us (PB), as an aspiring cardiac anaesthetist with an interest in resuscitation, remembers Brian as a humble and gentle, yet effective, person, always approachable and politely receptive to any modest (sometimes they were very modest indeed!) ideas one would have. He was a big man in every sense of the word, with a warm smile that has been captured in his photograph.

References

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