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The birth of intensive care medicine: Björn Ibsen's records

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Abstract The birth of intensive care medicine was a process that took place in Copenhagen, Denmark, during and after the poliomyelitis epidemic in 1952/1953. The events that led to the creation of the first intensive care unit in the world in December 1953 are well described. It is generally agreed upon that the start of the process was the fact that an anaesthesiologist (Björn Ibsen) was brought out of the operating theatre and asked to use his skills on a 12-year-old girl suffering from polio. The medical record of the girl contains a minute-by-minute description of the historical event. A translation of this part of the record is published as an Online Resource to the article. The role played by the epidemiologist Mogens Bjørneboe is further

analysed. He was the catalyst of the process, being the one with the idea that the skills of an anaesthesiologist could be used for other purposes than surgery. When first Ibsen realised what could be done with his skills, he proved to be one of the most progressive and inventive doctors seen in modern medicine. An interview with Prof. Ibsen in 2006 is published as an Online Resource to the article.

Keywords Intensive care · Björn Ibsen · Mogen Bjørneboe · HCA lassen · Blegdam · Copenhagen · Poliomyelitis · Polio epidemic 1952 · Respiratory failure · Positive pressure ventilation · History of medicine

The birth of intensive care medicine, as it is generally acknowledged today, was the result of a succession of unconventional methods and solutions hastily improvised by a Danish hospital in order to cope with the overwhelming medical and organisational challenges of the poliomyelitis epidemic of 1952.

If 1952 can therefore be considered as the *annus mirabilis* of intensive care, the event was far more gradual in detail: A last desperate attempt to save the life of a 12-year-old turned out surprisingly well. This led to the organisation of a single-disciplinary unit to treat polio patients with respiratory failure. This unit developed into a multidisciplinary

recovery room and finally ended up as a multidisciplinary intensive care unit. The entire process took just 17 months, and—more surprisingly—the honours for this remarkable achievement are widely conferred on only one man, who is recognised for having designed and performed each of these revolutionary steps: Dr. Björn Ibsen, also commonly known as the “father of intensive care medicine”.

The events around the poliomyelitis epidemic in Copenhagen in 1952 have been widely published [1, 2–8] and shall therefore only be summarised in the first part of this article. However, there remains a question surrounding Ibsen; a man who performed such exceptional

achievements but long remained astonishingly silent about his intensive care contribution, Ibsen took more pride in his discoveries on the treatment of shock than his pioneering work on intensive care [9]. There have been speculations [10] over why Ibsen chose to publish his work concerning this new branch of anaesthesiology as late as 1958, in a small journal and in a language unknown to most of the world (Danish) [11]. Ibsen was nevertheless an ambitious physician: He decided to become an anaesthesiologist because it would take too long to reach a senior position as a surgeon, and travelled to the USA to learn state-of-the-art anaesthesia from Dr. Beecher (Massachusetts General Hospital) [12].

Ibsen humbly pointed out “what we did was just to use the principles and techniques, which served us well in the operating theatre, also on patients with medical diseases” [10]. After having carefully collected historical facts, some so far unpublished, and after interviewing Ibsen, I came to the conclusion that he placed his performance in perspective to the mentoring and inspirational role played in the development of intensive care by another colleague: Mogens Bjørneboe.

The poliomyelitis epidemic in Denmark in 1952 was dramatic by all standards. The number of patients with respiratory failure was higher than in any other European country [2]. The Blegdam Hospital, responsible for the treatment of poliomyelitis, counted only one tank respirator and six cuirass respirators for a daily admission of 6–12 patients with respiratory failure [13]. Additionally, all conventional treatments proved to be almost completely inefficient (27 of the first 31 patients with respiratory failure had died [2]). Blegdam Hospital’s Chief Physician, Dr. Lassen, was desperately seeking good advice. Upon the suggestion of his colleague Dr. Bjørneboe, he contacted the anaesthesiologist Björn Ibsen. On 27 August 1952, Ibsen demonstrated his anaesthetic skills on a 12-year-old girl named Vivi E., who was in a state of severe respiratory failure. Ibsen ventilated the tracheotomised girl with a to-and-fro system, sucking the mucus from her lungs and narcotising her in order to release her bronchospasm. As it became clear that the available cuirass respirator could not provide sufficient ventilation, Ibsen continued to ventilate the girl manually and eventually saved her life. Within 8 days, the method of manual ventilation via tracheostomy was conducted on every patient with respiratory failure from poliomyelitis within Blegdam Hospital [1].

The author found the original and unpublished patient record of Vivi E., including a minute-by-minute transcription of the dramatic hours where Ibsen fought for Vivi’s life. (For a translation of the medical record see Online Resource 1.)

Shortly after having successfully completed the first two steps on the way to intensive care medicine, Ibsen moved to the county hospital of Copenhagen (Kommunehospitalet) (Fig. 1). On 1 July, he opened a recovery room, which had become a multidisciplinary intensive care unit by



Fig. 1 A young patient with poliomyelitis being manually ventilated by a medical student during the poliomyelitis epidemic in Copenhagen, 1953 [Source: Medical History Museum in Copenhagen]

December [6]. Bertelsen and Cronqvist determined that the first “real” intensive care patient was a 43-year-old male treated on 21 December 1953 [10].

The influence of Mogens Bjørneboe

In 1952, Ibsen was a young and talented anaesthesiologist, but his organisational talents may have remained long undiscovered if he were not to have met a physician who quickly recognised his potential and who mentored and inspired him: Mogens Bjørneboe.

Bjørneboe was a Danish doctor, a singular physician who was not scared to develop new, audacious ways to treat his patients. As a young doctor, he witnessed patients being treated with electroshocks. The treatment implied that 40% of the patients seriously damaged their backs from muscular cramps. He realised that it was possible to reduce the cramps with curare and thus avoid the side-effects [14].

In 1950, Bjørneboe met Ibsen’s wife on a transatlantic trip from America. Mrs. Ibsen, a trained nurse, described her husband’s experience as an anaesthesiologist at the Massachusetts General Hospital. Bjørneboe’s interest was aroused, and he took notice of Ibsen [15].

When, in January 1952, Bjørneboe was faced with a case of congenital tetanus, he intuitively thought that these cramps could also be treated with curare [14], but realised that he needed the skills of a well-trained anaesthesiologist. He contacted Ibsen.

Ibsen, who was a product of Beecher's schooling, had little curare experience [5]. He still agreed to assist Björneboe in tracheotomising the newborn to apply artificial ventilation on a rocking bed and eventually treating the convulsion with curare. As the effect of the curare wore off, the convulsions re-emerged, and the two doctors turned back to use conventional treatment for tetanus [6, 12, 16].¹ The baby eventually died, but Björneboe started to understand the potential of this treatment, and Ibsen's skills made a lasting impression.

After the "polio experience" (May 1953), a 10-year-old boy with tetanus was admitted to Blegdam. Björneboe contacted Ibsen, who worked at the Kommunehospital and as a consultant at Blegdam Hospital. Ibsen had meanwhile gained confidence to "turn the tetanus-case into a polio-case" and treat the patient with narcosis and curare over several days [6]. Over 17 days the boy was manually ventilated before he finally recovered [16].

Ibsen was not a pioneer concerning positive pressure ventilation outside the operating theatre; Bower and Bennet had used the method on polio patients in 1950, albeit only in the short term and as a supplement to a tank respirator, so the idea of using positive pressure ventilation on polio patients was not new [17]. Also, Clemmesen

had developed a similar concept for treatment of barbituric intoxication.²

Ibsen's great achievement was to understand that, in terms of treatment, it was rather irrelevant which disease caused the respiratory failure; the treatment should remain fundamentally the same: secure proper ventilation. Today this seems evident, but at that time the idea was quite revolutionary. Starting from this conclusion he understood that patients could only be dealt with adequately if the hospital was reorganised to treat respiratory failures in a multidisciplinary centralised unit.

Ibsen did not only have this insight; he was also gifted with the organisational talent to improvise solutions and with the management skills to structure and maintain a long-term organisation within the hospital.

Online Resources 1 and 2 have previously been published in German in Reisner-Sénélar L (2009) *Der dänische Anästhesist Björn Ibsen—ein Pionier der Langzeitbeatmung über die oberen Luftwege*. Johann Wolfgang Goethe-Universität, Frankfurt am Main.

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¹ In the interview from 2006, Ibsen notes that the child was given narcosis and curare, and was tracheotomised and ventilated. In his recording of the event from 1975 [6], he notes that the child was treated with d-tubo-curare and ventilated on a rocking bed, but there is no mention of sedatives.

² In the 1940s, a physician named Clemmesen developed a method to treat patients with barbiturate poisoning which involved artificial positive pressure ventilation through tracheotomy for respiratory failure as well as treatment of shock. In 1949, he opened a centralised unit at Bispebjerg Hospital in Copenhagen [18].