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Frank Pantridge

Frank Pantridge died on Boxing Day, the 26th December 2004, in his native village of Hillsborough, in Northern Ireland. He was 88.

He was renowned for many things, but best known for his introduction of mobile cardiac care into the community in Belfast in 1966, and for developing the first portable defibrillator. In the late 1960s Belfast was described as the "safest place to have a heart attack". Since then his pioneering work has saved countless lives all over the world.

In the early 1960s, Pantridge reflected on the appalling mortality after myocardial infarction noting that most deaths occurred in the first 12 hours and the majority in the first 3 hours. Patients suffering from symptoms of myocardial infarction were not usually admitted to hospital until 12 hours had elapsed. It was known that the initial rhythm in out-of-hospital cardiac arrest was ventricular fibrillation and that this could be treated by prompt electrical defibrillation. Pantridge had noted that survival from in-hospital cardiac arrest was poor in the general wards, but much better in the intensive care unit where early defibrillation and advanced life support was available. He decided that the way forward was to bring intensive care facilities to the patient in the community and with John Geddes, his senior house officer at the time, he created a mobile resuscitation team of doctors and nurses from the cardiac department who would travel with equipment from the Royal Victoria Hospital in Belfast to the patient at the request of the general practitioner. 100,000 people lived within 1 mile of the hospital. The dedicated ambulance carried routine monitoring and resuscitation equipment including a primitive defibrillator.

At that time, defibrillation could only be provided by a mains powered device delivering a shock of alternating current (AC). Working with his technician, Alfred Mawhinney, he developed a "portable" defibrillator powered by two 12-volt car batteries with a static converter to deliver 230 volts AC. This weighed 70 kg and could deliver a countershock within the ambulance but on occasions the heroic team manhandled it into the patient's home! During the ensuing years Pantridge and his team developed the first rechargeable miniature defibrillator in conjunction with Cardiac Recorders Ltd that weighed only 3.2 kg and delivered a direct current (DC) shock which was much more effective in converting ventricular fibrillation.

Pantridge presented his results to the Association of Physicians in 1967. He received a cool reception which he described later – "We were disbelieved and indeed, to some extent ridiculed. The unfavourable comments emphasised the lack of need for pre-hospital coronary care, the prohibitive costs and the danger of moving a patient who had had a recent coronary attack". This was fairly typical of the "can't do it" mentality amongst physicians and administrators in the UK at the time. Nevertheless there were a few enlightened groups led by Douglas Chamberlain in Brighton, a team with one of the authors (PJFB) in Bristol and Ken Easton in Yorkshire who had established the British Association for Immediate care who persisted with the concept of sophisticated pre-hospital care.

The reception in the outside world was in sharp contrast to the reactionary British physicians and administrators, who feared extra work and expense. *Time Magazine* was excited about the concept of "Immediate Countershock" and pointed out that expensive sophisticated hospital coronary care units would be of little value if the patients died in the community before reaching hospital. Leaders in the United States were quick to introduce

the concept of mobile coronary care and units were set up by William Grace in New York in 1967, by Eugene Nagel in Miami in 1968, by Leonard Cobb in Seattle in 1970 and Richard Crampton in Charlottesville in 1972. Pantridge received accolades and honours galore in the United States including a citation in the records of the House of Representatives. In contrast the UK physicians did not offer official support until 1975 and the Department dithered until the 1980s when Sir Donald Acheson, an Ulsterman by birth, became its Chief Medical Officer and lent his official support to the concept.

Frank Pantridge was born in Hillsborough in County Down in 1916. He went to school in the village and the nearby market town of Lisburn and started medicine at Queen's University in Belfast in 1934, qualifying in June 1939. He was a talented medical student who had the highest principles and did not suffer some of his teacher's shortcomings easily. In his final clinical examination in medicine he made a diagnosis of pleural effusion, but was told by the examiner that he was wrong – the patient had pneumonia. Failure in this case would have meant that he would fail the entire examination. Convinced that he was right he persuaded the house officer on the ward to perform a pleural tap and took the resultant fluid that evening to the home of the Professor of Medicine. He handed the specimen to the maid at the door with a note summarising the situation. He passed with honours. He was not a person to be trifled with!

He started his post as house physician at the Royal Victoria Hospital in Belfast on August 1st 1939. War was declared a month later on September 3rd and the next day Pantridge was among 11 of the 13 house officers who volunteered at the local military recruiting centre. They were made to wait for 6 months to acquire some clinical experience and in April 1940 he was posted to Singapore as medical officer to the second battalion, the Gordon Highlanders. He remained with the battalion right through the Japanese invasion of Malaya and the fall of Singapore in 1942. He was highly critical of the British politicians and military authorities and their strategy in the region – a view that has been justified by history. In contrast – "I remember a remarkable *esprit de corps* in that officers' mess. I had never seen it before and I have never come across it since. It did not exist in any RAMC (Royal Army Medical Corps) fraternity or army hospital and certainly not among the staff of any National Health Service Hospital I was to encounter later".

During the cruel and violent campaign he was awarded the Military Cross (MC), a very high honour for bravery, rarely awarded to doctors in the field. The citation to support this award reads: "During the operations in Johore and Singapore … as medical officer attached to the second Gordons, this officer worked unceasingly under the most adverse conditions of continuous bombing and shelling and was an inspiring example to all with whom he came in contact. He was absolutely cool under the heaviest fire and completely regardless of his own personal safety at all times". He was taken prisoner of war and continued as medical officer in the slave labour camp building the Siam-Burma railway, subsequently made famous in the film "Bridge over the River Kwai" starring Alec Guinness. Conditions were unimaginable and he was one of the few to emerge from the infamous Tambayla Death Camp in Kanchanaburi in Thailand. He was a thorn in the flesh of his captors throughout his incarceration. Upon liberation in 1945, he was described by a fellow medical officer as follows: "I found Pantridge in one of the many huts…. The upper half of his body was emaciated, skin and bones. The lower half was bloated with the dropsy of beri-beri. The most striking thing was the blue eyes that blazed with defiance. He was a physical wreck but his spirit was obviously unbroken. The eyes said it was indestructible…" He weighed just under 80 lb (30 kg).

After the war Pantridge returned to Northern Ireland to complete his year as a house officer. He quickly acquired his MD in 1946 and MRCP in 1947 and specialised in cardiology. He gained a scholarship to work at the University of Michigan with Frank Wilson who was the world leader in electrocardiography at the time. He was very happy there and acquired a good knowledge of electronics, which was to stand him in good stead in his development of the portable defibrillator over a decade later. He returned to Belfast in 1949 as a registrar and was appointed consultant physician and cardiologist in 1951. He undertook research into the cardiac effects of beri-beri to please the Dean but his main interest was in the management of the acute coronary syndrome.

Pantridge pulled no punches to achieve his mission and, while he did not suffer fools gladly, his achievements were always respected by his colleagues. His dedication to his patients was paramount and he would not tolerate anything that stood in the way of this, including laborious and ineffective administration, strikes by hospital staff and the activities of paramilitary terrorist groups in Northern Ireland. He was effective in stirring the hearts and minds of the public and was able to raise funds and support for his mobile coronary care service in the community. He has always acknowledged the considerable contribution of John Geddes in the organisation and establishment of in-hospital resuscitation and the mobile cardiac care service. “These might not have come about if Dr. John Geddes, now in Canada alas, had not been in the Cardiac Department of the Royal Victoria Hospital from 1964 to 1967”. Coming from Frank Pantridge, this is the verbal equivalent of a standing ovation. His other disciples, John Kernohan and Charles Wilson, set up similar community cardiac services in other parts of Northern Ireland and produced data to support Pantridge's results, which are now acknowledged world wide.

The authors both had the experience of being his students, PJFB in 1955 and TFB in 1963 (he taught to some extent by intimidation but it was effective). He was a gifted teacher who could hear a soft diastolic murmer two rooms away. His bedside manner was unorthodox but remarkably effective given his reputation and authority. Upon being informed before the ward round that Mr. X was in low spirits, he would lead the group to the end of the bed, look intently at the patient and pronounce, “You are very well Mr. X, doesn’t he look well Sister? Yes Sir. There I told you Mr. X – you are very well!”

We noted his deformed finger nail beds as he held his stethoscope to the chest – his fingernails had been pulled out by his captors in Tambayla. As his house officer in 1964, TFB learned to apply CPR and defibrillation, a technique which surprised the other consultant physicians, including the Professor of Medicine at the time, Graham Bull, who made him promise that if I should ever have a cardiac arrest “under no circumstances will you subject me to resuscitation”. He was deadly serious.

Things have moved on from there.

Frank Pantridge was a sociable person, always happy to share a drink (not small or single) with amiable colleagues. He had a fund of stories from his “Unquiet Life” – the title of his autobiography. He was great company with invariably stimulating conversation, a biting wit and with a unique and demonstrative body language.

We mourn the loss of one of the great men of Ulster.

Acknowledgements


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Further reading

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[2]. [2]Baskett TF, Baskett PJF. Resuscitation Great: Frank Pantridge and mobile coronary care. Resuscitation. 2001;48:99–105.