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Gerald Keen: pioneering cardiothoracic surgeon

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Cardiothoracic surgeon Gerald Keen helped pioneer techniques in cardiac surgery and achieve its regional expansion in the south west of England from the 1950s onwards. He introduced cardiopulmonary bypass to Bristol in 1965 and developed facilities for open heart surgery at a time when services outside London were comparatively under-resourced and underdeveloped.

Keen worked at Bristol Royal Infirmary, the Bristol Royal Hospital for Sick Children, and Frenchay

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Hospital from 1964 until 1991. His practice was originally thoracic and cardiac, both adult and paediatric, but over the years he concentrated increasingly on adult cardiac surgery, predominantly valve replacement and coronary artery bypass surgery.

Years after he had retired, Bristol Royal Infirmary was engulfed in scandal, with landmark inquiries into the deaths of children who had heart surgery there during the 1980s and 1990s which brought disgrace for two cardiac surgeons with whom Keen had worked—James Wisheart and Janardan Dhasmana.

Life and career

Born in London to parents who ran a greengrocers, Keen studied at King's College London and the Westminster Hospital on an entrance scholarship in anatomy and physiology. After qualifying he served in the jungles of what was then known as Malaya as part of his national service, which he considered a "maturing experience," say friends. Cardiac surgery was an evolving specialty throughout Keen's career, and he incorporated successive developments into his own practice. He trained with Russell Brock at the Brompton Hospital and with Charles Drew and Price Thomas at the Westminster Hospital. "While working under Drew's direction he developed the technique of profound hypothermia and circulatory arrest which was one of the methods which permitted open heart surgery to begin," says Wisheart.

Profound hypothermia was used in open heart surgery in infants, when cooling to low temperatures allowed the surgeon prolonged periods of total circulatory arrest for operating on the stationary open heart. Keen and Drew published a paper on the technique, and Keen a thesis, for which he was awarded recognition by the University of London.

Keen spent a year in San Francisco working with Frank Gerbode, the noted American heart surgeon who contributed to the training of several British heart surgeons in the new specialty of open heart surgery, which in the UK was largely focused on London. When he joined Bristol Royal Infirmary in 1964 Keen was the only full time cardiac surgeon in the south west of England, serving a population of over three million people.

Antony Baker, a retired consultant vascular surgeon who worked in Bristol at Frenchay Hospital and Southmead Hospital, says conditions in the 1950s and 60s for specialist cardiac practice were rudimentary and poorly equipped by today's standard. "In 1964 there was no ultrasound, no scanners, and no coronary angiography. They all became available between five and 12 years after Keen's appointment," says Baker. He says cardiac surgeons of that era were "ground breaking pioneers" operating on patients who were desperately sick and had very poor prospects otherwise. "We wouldn't have cardiac surgery like we have now if it wasn't for the risks these people took," he told *The BMJ*. "Gerald was faced with a huge pool of patients with advanced and often terminal heart failure, so far treated with the inadequate drugs of the time, who were referred for surgery as a last resort and consequently had a high mortality.

"This experience was typical of most cardiac surgical centres, which were under-resourced and understaffed, with undertrained doctors and nurses. Consequently, cardiac surgery in the UK was for some years hazardous and dangerous before it gradually became the safe and routine specialty we are used to today."

Keen would develop a strong interest in chest injuries and was a pioneer in the treatment of traumatic rupture of the thoracic aorta. He held the Hunterian professorship awarded by the Royal College of Surgeons, wrote a textbook on chest injuries, and edited another on operative surgery and management. He helped to expand the regional cardiac unit at Bristol Royal Infirmary into a major centre, showing "considerable determination in the face of some resistance," says Wisheart. "To achieve all these things you have to struggle and work very hard and very persistently, and he did that and achieved notable results which were the foundation of the work of the unit in the years to come," he says.

"His legacy also includes many patients enjoying a good quality of life after successful treatment and those young doctors whose training was under his supervision," says Wisheart.

In retirement, Keen maintained a medicolegal practice for many years.

In 2016, Keen's wife, Marian, to whom he was married for 61 years, predeceased him. He leaves their two sons—David, a dentist, and Richard, an industrialist.

Bristol heart surgery scandal

Keen had retired before the Bristol Royal Infirmary inquiry—one of the NHS's biggest ever investigations—was set up in 1998 to examine the deaths of 29 babies undergoing heart surgery at the hospital in the late 1980s and early 1990s. But he contributed evidence in a written statement in 1999. Wisheart, who was also the hospital trust's medical director, was struck off and Dhasmana suspended from carrying out paediatric cardiac surgery for three years. They were found to have lacked insight and failed to recognise their performance lagged that achieved by other units. The inquiry highlighted unsafe care, lax oversight, a secretive "club culture" among doctors, poor leadership and teamwork, and no systematic mechanism for monitoring clinical performance. It called for a revolution in openness, stating "there was enough information from the late 1980s onwards to cause questions about mortality to be raised both in Bristol and elsewhere had the mindset to do so existed."

The inquiry also found that the physical setup was "dangerous," with surgeons on one site—at the Royal Infirmary—and paediatric cardiologists several hundred metres away at the children's hospital.

In Keen's written evidence statement, he said that he was not associated with open heart surgery on children at Bristol Royal Infirmary from 1978 onwards and played no part in either the management or referral of Wisheart's patients. He stated both Wisheart and Dhasmana were well qualified to undertake open heart surgery on children. He also stated it was clear with hindsight that having paediatric open heart surgery split between two sites could have adversely affected children's care, but the model was "the best available at the time."

Wisheart stayed close friends with Keen, with whom he worked for over a decade and shared an office, and gave a eulogy for him at his funeral. He said Keen was "an ideal colleague—loyal, supportive and cooperative," who made important contributions to cardiac surgery and cardiac surgery in Bristol. Asked if Keen gave him any advice while they were working regarding operations he performed, Wisheart told *The BMJ*, "I think it would be fair to say we each made our own individual decisions concerning the patients for whom we were responsible."

Gerald Keen (b 1926; q London 1950; FRCS Eng, MS), died from cardiac and respiratory causes on 11 August 2022

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