

doi:10.1093/eurheartj/ehx695

50th Anniversary of the first Human Heart Transplant—How is it seen today?



The event

On 3 December 1967, a large medical, nursing, and technical team led by the surgeon Christiaan Barnard performed the world's first human to human heart transplant, placing Groote Schuur Hospital in Cape Town, South Africa, on the international map. This led to unprecedented media coverage. Indeed, this first heart transplant was the world's most widely reported medical event ever, resulting in the celebrity status of a previously unknown physician. In addition to its importance in the medical realm, the first human to human heart transplant had great political importance, as this moment of medical history contributed to substantial publicity for the increasingly isolated apartheid state. Why did the first human heart

transplant lead to such media frenzy never seen before or anticipated by Christiaan Barnard and his colleagues around the world?

For centuries, the heart had been equated with the soul of human beings. This concept was e.g. present among several pre-Columbian indigenous populations, including the Aztecs. By far the most common form of human sacrifice in the 15th century Aztec empire was heart-extraction, which seems to have related to the Aztec belief that the heart was both the seat of the individual's soul and a fragment of the sun's heat. As such, transplanting the heart was perceived as 'the surgical equivalent of the ascent of Everest' as the Times phrased it.

There will probably never again be a similar medical achievement in the public eye.



Chris Barnard operating.
Photo courtesy UCT



Groote Schuur Hospital 1967.
courtesy UCT



Media frenzy. Philip Blaiberg leaving hospital after Chris Barnard's second heart transplant.
Photo courtesy UCT

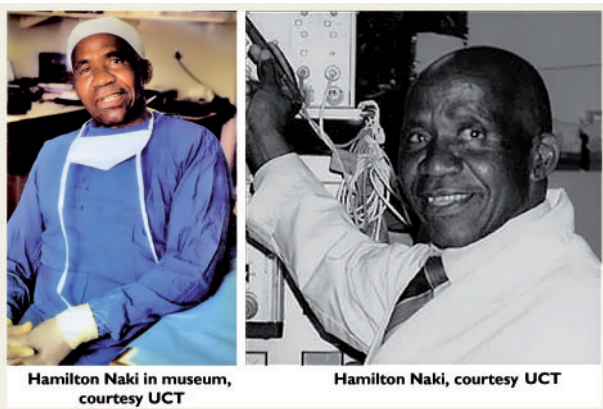
The team

History does not appear to have provided sufficient credit to the exceptional team of specialised operating room nurses, technologists, biochemists, anaesthetists, perfusionists, and others who contributed to the achievement of this monumental medical breakthrough. In addition to the lack of recognition for the entire team of individuals responsible for the success of the surgery, the fundamental importance of the basic research done not only by Barnard but by other researchers in outstanding laboratories was not always sufficiently highlighted.

It may not alleviate the criticism that Barnard himself is less known for his other truly novel concepts, from congenital heart disease to aortic aneurysm surgery, culminating in the so-called piggyback heterotopic heart transplantation which used the approach of adding a donor heart to the patient's ailing heart. Yet, does the poor recognition of entire research teams or contributing technologists, independent of race or gender, reduce the role of the pioneering individual researcher? Probably not.

A truly innovative researcher has to face the fact that fame and shame lie very close together in the development of exceptionally novel concepts. Had this first cardiac transplant gone wrong other than for a late pneumonia, voices would have been even louder, claiming the procedure to be irresponsible, and premature and that failure could have been predicted from the start. Chris Barnard and other famous researchers have taken this risk. He received immediate recognition for this success, but there are many examples in history where researchers have been isolated and victimized by colleagues for many years before the uniqueness of their research and its contribution to the betterment of humankind has been recognized.

There was also little mention of Hamilton Naki, in the media. Naki was a black gardener who, based on his enthusiasm and gifted hands, worked in the famous animal laboratory at Groote Schuur Hospital and participated in the research leading to the first and subsequent human cardiac transplants. Naki, who came from a relatively wealthy family from rural Transkei, had no access to higher education due to the political situation in South Africa at the time.



Chris Barnard stated in several interviews how important Naki was for his expertise at running the animal laboratory and in training an entire generation of future surgeons. 'I stole with my eyes' Hamilton Naki said when asked how he learned his formidable

surgical skills without any formal training (Refs. 1 and 2) In 2003, Naki received his honorary Master of Medicine degree from the University of Cape Town, in recognition of a man who may have ended up with a different career were it not for the limitations imposed by apartheid. Laudatory obituaries appeared after his death in the press, suggesting that he was the surgeon who harvested the donor heart at the epoch-making first human cardiac transplant.

Inevitably, comparisons with Vivian-Thomas' role in the so-called Blalock–Taussig procedure were drawn. The original procedure—providing palliation to patients with cyanotic heart defects which commonly cause blue baby syndrome—was named after Alfred Blalock, a surgeon, and Helen Taussig, a cardiologist from the Johns Hopkins Hospital in Baltimore, USA in the 1940's. Thomas, Blalock's African American laboratory technician, was fundamental in the development of that procedure, performing the operation alone in about 200 laboratory dogs and adapting the surgical instruments for the first human operation. However, because of the racial prejudices in the USA at the time and the academic custom which precluded mention of laboratory assistants without university degrees that persist into modern times, Thomas did not receive recognition for his contributions until much later.

Yet, claiming that Hamilton Naki was involved in the actual first heart transplant and that he even did the harvesting procedure of the donor heart did harm to the legacy of a great man, as it was not reflecting the truth. These claims were strongly refuted by those present at the operation. Amongst those who set the record straight were several who otherwise praised Naki for his contribution including Marius Barnard, the surgeon who had performed the harvest with Terry O'Donovan.

Innovation in context of time

As much as pioneering milestones in human history are realised by curious, strong-willed individuals, they occur within the context of enabling background developments. Cardiac surgery had only been performed for less than 10 years. Driven by the high burden of rheumatic heart disease in Europe and North America in the post war era, technological developments finally allowed the replacement of diseased heart valves in patients who would have died without surgery. The first patients received a replacement valve only 9 years before the first heart transplant. The invention of the heart lung machine in 1953 made this possible, invalidating the dogma of Theodor Billroth, the pioneer of gastric surgery in the 19th century. He famously stated that he who touches the heart would lose his respect. As much as general surgery had its foundation and flourished in Europe a hundred years earlier, cardiac surgery naturally saw its cradle in the technologically booming USA of the 1950s.

The Man

The Times magazine (Ref. 3) printed a personal letter by Christiaan Barnard the day after his death. This letter provides a reflection of his personal life in the context of his upbringing and achievements and portrays a different picture of the 'glamorous man' as seen by so many. Christiaan Barnard was born in Beaufort West in the harsh but strikingly beautiful Karroo. His father was a missionary who did not

accept differences between ethnic groups in his church and Barnard claims that his tolerance towards people from various background came from his father. His father also taught him his love for nature, pointing out plants, and animals leading to Christiaan's love for the veldt and wilderness of this vast special region of South Africa.

After his retirement in 1983 he could buy a farm outside of Beaufort West—returning to his roots. In this letter, he describes his challenges and his truly remarkable career from being for a few years a general practitioner in Ceres, the Western Cape, from being rejected for a bursary in England, leading to his general surgical training in the USA under Professor Wagensteen, University of Minnesota. Because his job application at the National Heart Institute in London was unsuccessful, he returned to South Africa to establish his own cardiac surgical unit culminating in the 1967 first heart transplant.

In his letter, Chris Barnard writes that he retired rather early because he wasn't eager for work anymore and that the arthritis was more of an excuse. He wrote several books, started lecture tours and set up the Chris Barnard Foundation. He felt that medical technology had replaced the personal doctor–patient relationship.

Days before his death, at the age of almost 79 he stated that he had no regrets.

The celebration

To mark this anniversary within the cardiovascular community, a high-profile event titled: '50 Years of Heart Transplantation: Courage and Innovation', is held at Groote Schuur Hospital, Cape Town, South Africa, 2–4 December 2017. The world's first human-to-human heart transplant, performed by Christiaan Barnard and his team 50 years ago in Cape Town, was a truly iconic event. It positioned the African region at the forefront of medical innovation and inspired the next generation of health professionals in Africa and worldwide. Developments in cardiac surgery continued to be impressive in the 50 years since then. Many of the inventors of this journey will have come together in Cape Town.

Yet, an event celebrating the most outstanding example of courage and innovation in cardiac surgery must also address today's need for a quantum leap of comparable magnitude. Rather than surgical, contemporary challenges are socio-economic in the developed and the developing world. Both, cardiovascular life-style diseases of the 'North' such as obesity and its associated metabolic syndrome and the endemically prevailing rheumatic heart disease of the 'South' mainly affecting the poor are abundant. While access to cardiac surgery may be suboptimal for some of these patients in the 'North', it is often absent in the 'South'.

Planned for a long time with the active support of all major international cardiothoracic societies as well as humanitarian organizations, the editors-in-chief of the major journals as well as the top echelons of industry, will engage in a day-long 'South-North Dialogue' to address the plight of 'the many' i.e. the millions of patients with rheumatic heart disease who have no access to life-saving heart valve surgery.

This was also recently highlighted at the first African Summit held by the World Heart Federation in Khartoum, Sudan 10–11th October 2017. Data recently presented in the *New Eng J Med Report* (Ref. 4) reported that Central Sub-Saharan Africa has among the highest age standardized prevalence of adults living with Rheumatic Heart Disease. South African has a prevalence of 220/100 000 people vs. 415/100 000 in Ghana and 360/100 000 in Nigeria.

It is timely, as the WHO Executive Board, supported by the World Heart Federation unanimously recommended a World Health Assembly Resolution on Rheumatic Heart Disease to be adopted in May 2018. The event '50 Years of Heart Transplantation: Courage and Innovation', will bring together leaders in cardiothoracic surgery, cardiologists, policymakers and representatives of the device industry, condensing their vision for the way forward in a 'Cape Town Declaration'.

It is the intention of all participants to create a focused and prioritised blueprint for all stakeholders, to improve awareness, education and access, for a deadly disease which may affect more than double the number of patients infected with HIV.



Conflict of interest: none declared.

References

References are available as supplementary material at *European Heart Journal* online.