

Adib Jatene (1929-2014)

Adib Jatene in Brazil was the first surgeon to successfully perform the arterial switch operation in 1975. The operation corrected a heart condition in infants called transposition of the great arteries (TGA). Left untreated, infants with TGA die, as their blood cannot supply oxygen to their bodies. Jatene's operation became widely used to correct the condition. Aside from medical research, Jatene worked for years in politics and education, serving as Brazil's minister of health and teaching thoracic surgery at the University of São Paulo.

Adib Jatene was born 4 June 1929 to Anice and Domingos Jatene in Xapuri, Brazil, which is a town by a rainforest close to the border of Peru and Bolivia. Both of Jatene's parents immigrated from Lebanon. Jatene's father worked as a rubber tapper, extracting latex from rubber trees, before he contracted yellow fever and died. Jatene grew up with his mother and three brothers.

After the death of Jatene's father, Jatene's mother moved the family to Uberlândia, Brazil, where she started a business and Jatene attended elementary school. Jatene later moved to São Paulo, Brazil, for high school. To pursue a career in medicine, Jatene began medical school in 1948 at São Paulo University in São Paulo. Jatene's aimed to return to his birthplace, Xapuri, to practice medicine, but while in medical school he met Euryclides de Jesus Zerbini, a physician who later performed the first heart transplant in Latin America in 1968. In 1951, Jatene was part of Zerbini's team to perform the first valvular commissurotomy, a surgery to replace a heart valve that is too narrow. Jatene graduated from medical school in 1953.

Jatene married Aurice Biscegli in 1954, and they had four children. Their first, Fabio, was born in 1955 when Jatene moved to teach and practice medicine near the University of Uberaba, in Uberaba, Brazil. Jatene worked to develop heart surgery in that region but lacked a heart-lung machine, so he built one with the help of professionals at an auto repair and engine reconditioning shop. While in Uberaba, Jatene's second child, Ieda, was born in 1956 and his third, Iara in 1958. Also, in 1958 Jatene returned to São Paulo to work with Zerbini at University's Heart Institute of the Hospital das Clínicas in São Paulo, Brazil.

In 1961, Jatene's fourth child Marcelo was born, and Jatene began working at Instituto de Cardiologia do Estado de São Paulo (the Institute of Cardiology of the State of São Paulo) (ICESP), now called Instituto Dante Pazzanese de Cardiologia (Dante Pazzanese Institute of Cardiology) (IDPC), in São Paulo, Brazil. In the 1960s, Jatene began working on an artificial cardiac pacemaker, a device used to make the heart beat if it cannot on its own, and named his version the ICESP model, after the Institute of Cardiology of the State of São Paulo. Jatene also designed experimental treatments for a heart condition called Chagas disease, which is transmitted by bloodsucking bugs and causes damage to the heart and nervous system.

In the 1970s, Jatene became the director for the Dante Pazzanese Institute of Cardiology. While the IDPC director, Jatene designed a treatment for patients with Chagas disease. Student researcher Elias Boainain used Jatene's plan to treat the patients with benznidazole and nifurtimox, antiparasitic drugs that kill the bloodsucking bugs that cause the disease. Jatene also helped to establish the criteria for the masters and PhD programs at Federal University of Goiás in Goiânia, Brazil, between 1974 and 1975.

During the 1970s, Jatene began developing an operation to correct a condition called transposition of the great arteries (TGA). Transposition of the great arteries (TGA) is a condition in which two major blood vessels connected to the heart, the aorta and pulmonary arteries, are switched from their normal positions in terms of their location on the heart. The aorta normally pumps oxygenated

blood from the lungs through the heart and into the body. When the deoxygenated blood returns to the heart, the pulmonary artery normally pumps the blood to the lungs for oxygenation. In infants born with TGA, the arteries pump blood in two separate loops. In one loop, blood from the lungs goes to the heart and straight back to the lungs. In the other, deoxygenated blood from the body comes into the heart and then is pumped back to the body without going through the lungs. Infants born with TGA cannot survive long after birth because their blood does not receive oxygen from the lungs, so the rest of their body does not receive oxygen. Jatene developed the arterial switch operation, in which a surgeon returns the transposed vessels to their anatomically normal positions and takes the coronary arteries, which lay on top of the pulmonary artery, and places them on top of the aorta.

Other surgeons had attempted similar operations before Jatene. In 1952 and 1953, Charles Bailey, who operated on patients with TGA at Hahnemann Hospital in Philadelphia, Pennsylvania, had attempted to leave the coronary arteries on the pulmonary artery instead of transferring them to the aorta. All of his patients died. In 1954, Harold Albert, who worked at the Louisiana State University Medical Center in New Orleans, Louisiana, hypothesized that the surgery would be successful if both coronary arteries were transferred from the pulmonary artery to the aorta. In 1954, William Mustard, who performed surgeries at Toronto's Hospital for Sick Children in Toronto, Canada, transferred only the left coronary artery and not the right coronary artery, but all three of his patients died. On 8 May 1975, Jatene surgically switched both coronary arteries and the vessels, thus performing the first successful arterial switch operation. Jatene's operation became the standard treatment for those born with TGA, replacing the Mustard operation by 1998.

Starting in 1977, Jatene was the general director of the Heart Hospital of the Associação Sanatório Sírio (Syrian Sanitarium Association), and in March 1979 Jatene became the health secretary of São Paulo. Jatene later noted that São Paulo was at that time becoming rapidly urbanized and that there were too few physicians and hospitals to serve the growing city. To address that issue, Jatene began working with others on the São Paulo Metropolitan Health Plan to establish 450 health centers and forty hospitals in the São Paulo community. Jatene remained health secretary until 1982, and the Metropolitan Health Plan established nearly half of the medical centers it had planned.

In the 1980s, while continuing his medical work to correct heart malformations, Jatene served in several organizations. In 1980, Jatene founded and became president of Brazil's National Council of Health Secretaries. He worked to establish standard criteria for medical schools. Those qualifications included that the medical school have a hospital and an outpatient medical complex that had operated for at least two years and functioned as a regional referral center. In 1983, he became professor of thoracic surgery at the University of São Paulo. A year later, he became an honorary member of the American Association for Thoracic Surgery. He also founded and served as president of the Brazilian Society of Cardiovascular Surgery between 1984 and 1985, when he became president of the Department of Cardiovascular Surgery of the Brazilian Cardiology Society.

Jatene was president of the International Society for Cardiovascular Surgery in 1985 and 1987. He was a member of the Commission of Medical Education Specialists of the Ministry of Education in 1986 and 1990. He was also a member of Brazil's National Health Board in 1986 and 1992 and a member of the Regional Medical Council of the State of São Paulo in 1988 and 1992. In 1989 Jatene was elected to be a titular member of Brazil's National Academy of Medicine and then was Brazil's minister of health for eight months in 1990. Jatene still worked and was active in the cardiovascular field.

While being active in committees and societies, Jatene again served as Brazil's minister of health for twenty-two months starting in 1995. He also directed the Heart Institute in Brazil until 1999, when he retired. He continued to co-author articles in the years following his retirement.

On 14 November 2014, Jatene died at age eighty-five. He was survived by his wife, four children, ten grandchildren.

Sources

1. Aiello, Vera Demarchi, and Ieda Biscegli Jatene Bosisio. "Adib Domingos Jatene." *Cardiology in the Young* 12 (2002): 479-83.
2. Albert, Harold M. "Surgical Correction of Transposition of the Great Vessels." *Surgical Forum* 5 (1954): 74-7.
3. Atik, Fernando Antibas, Altamiro Ribeiro Dias, Pablo Pomerantzeff, Miguel Barbero-Marcial, Noedir Antonio Groppo Stolf, and Adib Domingos Jatene. "Immediate and Long Term Evolution of Valve Replacement in Children Less than 12 Years Old." *Arquivos Brasileiros de Cardiologia [Brazilian Archives of Cardiology]* 73 (1999): 424-8. http://www.scielo.br/scielo.php?pid=S0066-782X1999001100002&script=sci_arttext&tlng=pt (Accessed May 17, 2016).
4. Bailey, Charles P., B. A. Cookson, D. F. Downing, and W. B. Neptune. "Cardiac Surgery under Hypothermia." *The Journal of Thoracic Surgery* 27 (1954): 73-91.
5. Braile, Domingo M., and Enio Buffolo. "Adib Jatene: June 4, 1929 November 14, 2014." *Revista Brasileira de Cirurgia Cardiovascular [Magazine of Brazilian Cardiovascular Surgery]* 29 (2014): 473-477. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4408807/> (Accessed May 17, 2016).
6. "Chagas Disease." Mayo Clinic. 2014. <http://www.mayoclinic.org/diseases-conditions/chagas-disease/basics/definition/con-20030854> (Accessed May 18, 2016).
7. del Arco, José Núñez. *Health Services in Latin America and Asia Inter-American Development Bank Series*. Washington, D.C.: Inter-American Development Bank, 2001.
8. Dunlop, Marilyn. *Bill Mustard: Surgical Pioneer*. Toronto and Oxford: Hannah Institute and Dundurn Press, 1989.
9. "Facts about Jaundice and Kernicterus." Centers for Disease Control and Prevention. 2015. <http://www.cdc.gov/ncbddd/jaundice/facts.html> (Accessed May 17, 2016).
10. Jacobs, Marshall L., and Christo I. Tchervenkov. "Tribute to a Patriarch Adib Domingos Jatene, 1929-2014." *World Journal for Pediatric and Congenital Heart Surgery* 6 (2015): 7-8. <http://pchs.sagepub.com/content/6/1/7.extract#> (Accessed May 17, 2016).
11. Jatene, Adib, Valmir Fontes, Paulo Paulista, Luis, Souza, F. Neger, M. Galantier, and Eduardo Sousa. "Anatomic Correction of Transposition of the Great Vessels." *The Journal of Thoracic and Cardiovascular Surgery* 72 (1976): 364-70. <http://www.ncbi.nlm.nih.gov/pubmed/957754> (Accessed February 10, 2015).
12. Jatene, Marcelo Biscegli, Rosangela Monteiro, Maria Helena Guimarães, Siomara Christina Veronezi, Márcia Kyiomi Koike, Fabio Biscegli Jatene, and Adib Domingos Jatene. "Aortic Valve Assessment. Anatomical Study of 100 Healthy Human Hearts." *Arquivos Brasileiros de Cardiologia [Brazilian Archives of Cardiology]* 73 (1999): 81-6. http://www.scielo.br/scielo.php?pid=S0066-782X1999000700007&script=sci_arttext (Accessed May 17, 2016).
13. Mustard, William T., A. L. Chute, John D. Keith, A. Sirek, R. D. Rowe, and P. Vlad. "The Surgical Approach to Transposition of the Great Vessels with Extracorporeal Circuit." *Surgery* 36 (1954): 39-51.
14. Mustard, William T., John D. Keith, George A. Trusler, Robert Fowler, and L. Kidd. "The Surgical Management of Transposition of the Great Vessels." *The Journal of Thoracic and Cardiovascular Surgery* 48 (1964): 953-8.
15. "Parasites - American Trypanosomiasis (also known as Chagas Disease)." Centers for Disease Control and Prevention. 2016. http://www.cdc.gov/parasites/chagas/gen_info/vectors/ (Accessed May 17, 2016).
16. Pêgo-Fernandes, Paulo Manuel, and Noedir Groppo Stolf. "Professor Adib Jatene, a Youth of 80 Years." *Sao Paulo Medical Journal* 128 (2010): 55-7. http://www.scielo.br/scielo.php?pid=S1516-31802010000200001&script=sci_arttext (Accessed May 17, 2016).
17. Rassi, Anis. "Adib Domingos Jatene, 1929-2014." *Arquivos Brasileiros de Cardiologia [Brazilian Archives of Cardiology]* 104 (2015): 179-80. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4386844/> (Accessed May 17, 2016).
18. Stafford, Ned. "Adib Jatene." *British Medical Journal* 350 (2015): h324.
19. Sousa, J. Eduardo MR, Euriclides de Jesus Zerbini, Adib D. Jatene, Valmir F. Fontes, Helio M. Magalhães, and Cantidio Moura Campos Filho. "Transaortic Infundibulectomy for Hyper-

- trophic Subaortic Stenosis." *The American Journal of Cardiology* 15 (1965): 801-8.
20. Teixeira, César. "Adib Jatene, an Immense Legacy to Brazilian Medicine." *Revista da Associação Médica Brasileira [Journal of the Brazilian Medical Association]* 60 (2014): 502-4. http://www.scielo.br/scielo.php?pid=S0104-42302014000600502&script=sci_arttext (Accessed May 17, 2016).
 21. "Yellow Fever." Centers for Disease Control and Prevention. 2015. <http://www.cdc.gov/yellowfever/> (Accessed May 17, 2016).