

Perspectives in Veterinary Medicine

Vivien Thomas and the Role of Dogs in Experimental Surgery

By Dr. Donald F. Smith
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When I lecture on the topic of One Health, I sometimes tell the story of the first surgical repair of *blue baby* syndrome to demonstrate how important dogs were in achieving major advances in human medicine.

Through the first half of the 20th century, dogs were used extensively by physicians in medical schools to help them understand the physiologic and pathologic changes associated with disease in people. Many complex surgical procedures were tested by MDs first on dogs before they were performed on people. Surgical residents developed their technical skills in "dog labs" that were common in medical schools.



Anna, the experimental dog used to develop the corrective surgery for blue baby syndrome.

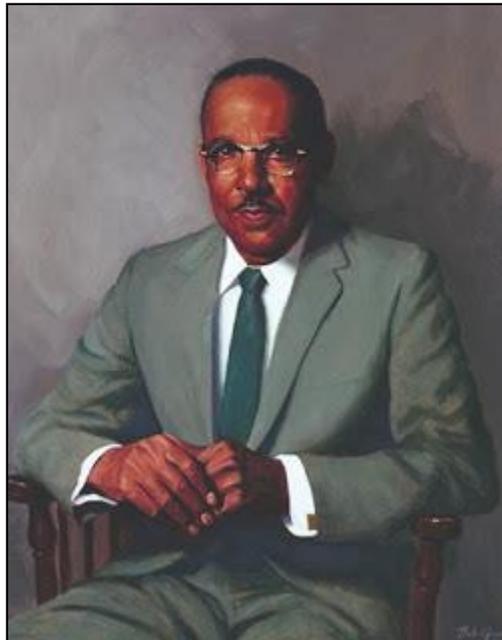
(Painting by de Nyselo Turner.)

(Photograph by Aaron Levin.)

(Image courtesy of the Alan Mason Chesney Medical Archives of the Johns Hopkins Medical Institutions.)

The *blue baby* story holds special interest to veterinarians not just because of its impact on human surgery, but also because of the special place of a dog named "Anna" in the folklore of the Johns Hopkins Hospital.

The term *blue baby* refers to the bluish-purple appearance of an infant's skin caused by lack of oxygen going to the tissues. A rare but well-known cause of this problem is tetralogy of Fallot, in which heart defects during fetal development result in the inability of the heart to pump venous blood into the lungs to be properly oxygenated. In the early 20th century affected babies usually died during the first year of life.



Vivien Thomas (1910-1985), the surgical technician who developed the technical procedure for treatment of tetralogy of Fallot.

Portrait by Bob Gee, 1969.

(Image courtesy of the Alan Mason Chesney Medical Archives of the Johns Hopkins Medical Institutions.)

In the early 1940s, Alfred Blalock was head of surgery at the Johns Hopkins Hospital, and Vivien Thomas was his laboratory technician. A cardiologist named Helen Taussig approached Blalock and Thomas in their surgical laboratory one day and appealed to them to find a way to surgically repair tetralogy of Fallot. Years earlier Blalock and Thomas had created an experimental model in dogs in which blood to the lungs had been rerouted. The two men devised a variation of that model in which the left subclavian artery was anastomosed to the pulmonary artery¹ in the hope that by rerouting some of the oxygen-deprived blood to the lungs these babies could be saved.

Blalock returned to his busy surgical practice and his administrative duties, and Thomas set about in his laboratory to create an experimental model in dogs to mimic the birth defect. Though he had never trained with a veterinarian, he devised a way to surgically produce a condition in dogs similar to the one affecting human babies. Once he could produce *blue baby*-like signs in his dog model, he operated on one of these affected dogs to see if the type of repair they had devised would correct the blood flow problem that was fatal to the babies. He designed instruments and delicate operative techniques to ensure that the repair could be performed on a tiny child. In his autobiography, Thomas said that he used 200 experimental dogs over a several-month period to accomplish this astounding breakthrough.²



Vivien Thomas (top left) stands behind Dr. Alfred Blalock during the ground-breaking operation for correction of tetralogy of Fallot, November 29, 1944.

(Image courtesy of the Alan Mason Chesney Medical Archives of the Johns Hopkins Medical Institutions.)

The experimental procedure was first tested in humans on a baby girl named Eileen Saxon on November 29th, 1944.³ Blalock was the surgeon. Looking over his shoulder and coaching him throughout the procedure was Vivien Thomas, whose knowledge of every minute detail of the operation was critical to its success. The symbiotic relationship between Blalock and Thomas was complicated by the fact that Thomas, who had no formal training in human or veterinary medicine, was also African-American. He worked in the segregated environment of Johns Hopkins, a story that was beautifully told in the HBO movie "Something the Lord Made" which premiered in 2004.

In his waning years and with Blalock deceased, Thomas identified the three individuals who were critical to the development of the Blalock-Taussig procedure. Equal with Blalock and himself, he included the dog named Anna. It is a beautiful example of One Health and the impact that physicians and human surgeons had on advancing canine anesthesia and operative techniques 80 years ago.

Thomas's expertise continued to have an impact on the human medical profession for decades as he used dogs to train surgical residents who later progressed to important positions at prestigious medical schools.

What is not reported in the many articles and stories about Thomas is that he occasionally also operated on privately owned dogs. Dr. Harold Burton, a veterinary practitioner living near the Johns Hopkins Hospital in Towson, MD, would sometimes call Mr. Thomas to help him deal with a complicated thoracic or abdominal procedure, especially one that involved serious anesthetic risk. According to Burton, Thomas was *“unquestionably the best canine surgeon of the time. His physical dexterity was phenomenal. His fingers were long and elegant, and his hands just flowed. He just made everything look so simple.”*⁴

¹ Anastomosis means “to be united with” so that blood would flow through a new channel to the lungs and thereby be oxygenated and sent on to the rest of the body.

² Thomas, Vivien T. *Partners of the Heart: Vivien Thomas and his work with Alfred Blalock: An Autobiography*. University of Pennsylvania Press, 1998.

³ Though the procedure was initially a success, the baby girl became cyanotic a few months later. A second procedure was performed but she did not survive. Surgeons later determined that children over three years of age were more likely to survive the Blalock-Taussig procedure. <http://www.medicalarchives.jhmi.edu/firstor.htm>.

⁴ Burton, Harold U, VMD, U Penn '43 (retired veterinarian in Towson, MD). Telephone conversation with Dr. Donald Smith (Cornell University) 2010.

KEYWORDS:

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ABOUT THE AUTHOR:

Dr. Donald F. Smith, Dean Emeritus of the Cornell University College of Veterinary Medicine, had a passion for the value of the history of veterinary medicine as a gateway for understanding the present and the future of the profession.

Throughout his many professional roles from professor of surgery, to Department Chair of Clinical Sciences, Associate Dean of Education and of Academic Programs and Dean, he spearheaded changes in curriculum, clinical services, diagnostic services and more. He was a diplomat of the American College of Veterinary Surgeons and a member of the National Academy of Practices. Most recently he played a major role in increasing the role of women in veterinary leadership.

Perspectives in Veterinary Medicine is one of his projects where he was able to share his vast knowledge of the profession.