DOI: 10.21088/jcms.2454.7123.11325.2

Journal of Cardiovascular Medicine and Surgery
Volume 11 Number 3/September - December 2025

REVIEW ARTICLE

Dr Kenneth K. Keown: A Foundational Pillar in Cardiac Anesthesiology

Ankita Singh[1], Surendra Kumar Jangid[2], Mohit Prakash[3]

HOW TO CITE THIS ARTICLE:

Ankita Singh, Surendra Kumar Jangid, Mohit Prakash. Dr Kenneth K. Keown: A Foundational Pillar in Cardiac Anesthesiology. Indian J Cardiovasc Med Surg.2025;11(3): 101–103.

ABSTRACT

Dr Kenneth K. Keown (1917–1985) was a pioneering American anesthesiologist whose work was instrumental in establishing cardiac anesthesiology as a distinct and essential subspecialty of anaesthesia. At the time when cardiac surgery was considered extremely high risk, Dr Keown developed anesthetic techniques that made intracardiac procedures safer and more reproducible. His contributions are invaluable in the evolution of modern cardiac anesthesia.

KEYWORDS

• Dr Kenneth K. Keown • Cardiac Anesthesiology • Mitral Valve Surgery

INTRODUCTION

Dr Kenneth K. Keown (Figure 1) was born in 1917; his father was a general practitioner in Missouri.[1] He lost his father due to septicemia from a cut injury sustained during a surgical procedure. One of his two elder brothers also died at the age of 14. These two events had a great impact on him and influenced him to enter the field of medicine. After undergraduate education at Graceland College in Iowa, he matriculated at Hahnemann Medical College and Hospital, where he met Dr Henry Ruth, an anesthetist at Hahnemann Hospital. Dr Keown was greatly impressed by Dr Ruth's personality and by the fact that Hahnemann Hospital had never employed a nurse anesthetist but, rather, a physician to administer anesthesia.While Dr Keown was also doing his internship at the Huron Road Hospital in Cleveland (now the Meridia Huron Hospital), Dr Rolland Whitacre (who later developed the Whitacre spinal needle) was invited to start an anesthesia program. Impressed by these

AUTHOR'S AFFILIATION:

[1] Assistant Professor, Department of Cardiac Anaesthesia and Critical Care, All India Institute of Medical Sciences, New Delhi, India.
[2] Department of Cardiac Anaesthesia and Critical Care, All India Institute of Medical Sciences, New Delhi, India.
[3] Department of Cardiac Anaesthesia and Critical Care, All India Institute of Medical Sciences, New Delhi, India.

CORRESPONDING AUTHOR:

Ankita Singh, Assistant Professor, Department of Cardiac Anaesthesia and Critical Care, All India Institute of Medical Sciences, New Delhi, India.

E-mail: ankitasingh299@gmail.com

➢ **Received:** 01-12-2025 ➢ **Accepted:** 29-12-2025

two anesthesiologists, Dr. Keown entered Dr Whitacre's anaesthesia residency program in 1941, but World War II interrupted these plans, and he served for 5 years as a medical officer on the front lines in Europe. During this time, he realized the urgent need to train more anesthesiologists. During the war, he attained the rank of major in the U.S. Army Medical Corps and earned the Silver Star with cluster and the Bronze Star with two clusters. After the world war was over, Dr Keown completed his two-year residency in anesthesiology under Dr Ruth at Hahnemann.[1-3] He spent his early career at Hahnemann Hospital, where he helped refine anesthesia techniques for heart surgery that resulted in consistently favorable outcomes.[2]

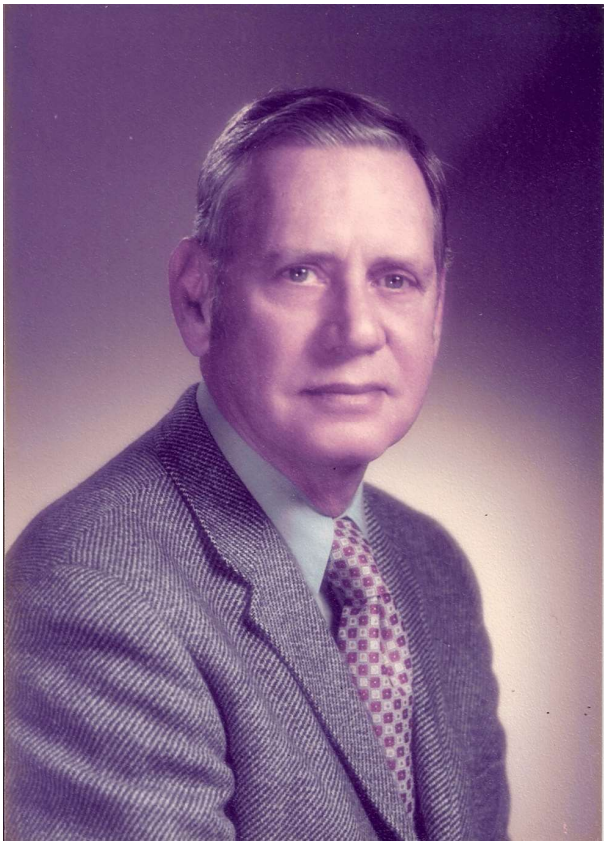

Figure 1: Dr Kenneth K. Keown

DEVELOPMENT OF CARDIAC ANESTHESIA

Valvular diseases of the heart were common due to the endemic nature of rheumatic fever in the United States in the early 1900s. Dr Charles P. Bailey was the chief of thoracic surgery at Hahnemann Hospital, and in his teenage years he had lost his father due to mitral stenosis. He had decided to devote himself in finding the treatment for mitral valve disease.[4] He collaborated with Dr Keown to make cardiac surgery an acceptable option for patients with mitral valve disease. In June 1948, they teamed up to perform an opening of the anterior and posterior commissures of a calcified mitral valve, a procedure from then on termed the "mitral valve commissurotomy". The patient was 24-year-old Mrs.Claire Ward, who was told that she had 6 months to live before the procedure. After the surgery, she lived 38 years, during which time she gave birth to two children.[2] During this landmark case, Dr Keown advocated for light levels of anesthesia achieved with an endotracheal tube and nitrous oxide/oxygen mixture combined with 0.2% intravenous procaine followed by intermittent doses of sodium thiopental. The goal was to have the patient awake and responsive at the end of the case to foster a smoother postoperative recovery and minimize cardiac depression and arrhythmia. The success of this surgery attracted considerable media attention. In an article in the famous Time magazine, Dr Keown was described as "the grand old man of anesthesia for inside-the-heart surgery," although he was quite young at that time.

ACADEMIC CONTRIBUTIONS AND PUBLICATIONS

Dr Keown was also a proponent of proper surgical selection of patients for cardiac surgery, emphasizing a detailed history and physical evaluation and open discussion with patients regarding their chances of survival and anticipated lifestyle changes after surgery.[2] In 1956, Keown published Anesthesia for Surgery of the Heart, the first monograph devoted entirely to cardiac anesthesia. This landmark text outlined comprehensive perioperative management strategies, careful patient selection, interpretation of data from investigations, and how to avoid pitfalls during anesthetic management for heart surgery. The book became a foundational reference and helped standardize cardiac anesthetic practice worldwide.[2,5]

INNOVATIONS AND PERIOPERATIVE CARE

Providing anaesthesia for heart surgery patients was challenging, and Dr. Keown faced a lot of obstacles. He used to rely

mostly on his God given natural senses to feel peripheral pulses, palpate temporal arteries, check warmth by touching them, and ensure that they did not become blue.Except for blood pressure cuffs and electrocardiographs, monitors did not exist back then.[2] Dr Keown did substantial research on the practical use of hypothermia and developed innovative techniques for achieving hypothermia during cardiac surgery.[2] Dr Keown's earliest means of cooling was a "chill chest" (a household freezer) used during the closure of an atrial septal defect.[2] Later techniques employed various means of ice water baths or circulating cooling blankets.[2] The increased metabolic demand of shivering was abated by thiopental and/or neuromuscular blockade. He also described safe duration, potential problems, and rewarming protocols for hypothermia.[2] Dr Keown was among the earliest clinicians to recognize the value of lidocaine as an antiarrhythmic agent during cardiac surgery. His early work with lidocaine established its safety and effectiveness as an antiarrhythmic agent.[2]

LEADERSHIP AND LEGACY

The University of Missouri established a new hospital in Columbia, Missouri, in September 1956, and Dr. Keown was the first chief of anesthesiology as a division inside the Department of Surgery. He founded a residency program in anesthesiology at the University of Missouri and played a key role in starting a program for respiratory therapy services and training. He also founded the School of Respiratory Therapy, one of the country's first bachelor's degree programs in respiratory therapy, and later helped to develop a master's degree program in respiratory therapy at the University of Missouri.[3]

On July 1, 1966, the University of Missouri established the Department of Anesthesiology, with Dr. Keown serving as the first Chairman.[3] The creation of a separate department was not easily obtained and required years of advocating, educating, and demonstrating a need for anesthesia to separate from the Department of Surgery. His impact extended beyond the University of Missouri, as three of the junior professors he recruited and supervised went on to become anesthesia chairs at the University of Pennsylvania, Louisiana State University, and Tennessee-Knoxville. In 1969, he became the Medical Director of the University of Missouri Medical Center. After six years in that post, he returned to the Department of Anesthesiology to pursue his primary purpose of teaching and developing future anesthesiologists. Keown held leadership positions in major professional organizations, including the American Society of Anesthesiologists and the American Medical Association, and contributed extensively to anesthesia education and research.[3] His influence extended beyond his lifetime through the trainees he mentored and the standards he helped to establish. Dr Keown had been a remarkable athlete before his professional commitments forced him to curtail all sporting activities except for an occasional golf game. While he was a senior student at Hahnemann Hospital, he met and married Helen Jane Mooney, who was a nursing student there; they had two children, Linda Jane and Kenneth K.We lost such a great anesthetist to lung cancer in September 1985.[3]

CONCLUSION

Dr Kenneth K. Keown stands as a foundational figure in cardiac anesthesiology. By developing specialized anesthetic techniques, keen observation, and perioperative innovations, he made intracardiac surgery safe and possible. The phrase "If I have seen further, it is by standing on the shoulders of giants," attributed to Isaac Newton, reflects the importance of the contributions of anesthesiologists like Dr Kenneth K. Keown in shaping modern cardiac anesthesia.

REFERENCES

1. Davidson J.A century of homeopaths: their influence on medicine and health. 1st ed. New York (NY): Springer; 2014.
2. Rosenberg H, Axelrod JK. Kenneth K. Keown, MD: pioneer of cardiac anesthesiology. J Cardiothorac Vasc Anesth.1994 Oct;8(5): 577-83.
3. McVey JD, Marshall JM, Johnson QL, O'Donnell F.Kenneth Keown (1917-1985): Innovator in Early Cardiac Anesthesiology. Cureus.2024 Aug 20;16(8).
4. Weisse AB.Charles P.Bailey.Clin Cardiol. 2005 Apr;28(4):208-9.
5. Keown KK.*Anesthesia for surgery of the heart*. Springfield, IL: Charles C.Thomas; 1963.p.xiii, 206.Review in: *British Journal of Surgery*. 1964 May; 51(5):397.