10.5005/jp-journals-10030-1223

HISTORICAL REVIEW

"Foggy Bottom Neighbourhood" Who Went on to Become the "Father of Modern Day Blood Banking": Life and Times of Charles Drew—Surgeon, Researcher, Activist, and Physician Extraordinaire

Saptarshi Biswas

RESUMEN

En un momento en que América estaba dividida racialmente, el Dr. Charles Richard Drew rompió las barreras para convertirse en uno de los científicos pioneros del siglo XX. Su investigación innovadora y los desarrollos innovadores en el uso y preservación del plasma sanguíneo durante la Segunda Guerra Mundial ayudaron a salvar miles de vidas, pero también revolucionaron el proceso de bancos de sangre de la nación y los procedimientos estandarizados para las técnicas de conservación y almacenamiento durante un largo período de tiempo. Esto fue adaptado más tarde por la Cruz Roja Americana. La invasión de Polonia por Hitler en septiembre de 1939 marcó el comienzo de la Segunda Guerra Mundial en Europa. Los líderes políticos estadounidenses, aunque esperaban mantenerse al margen de la guerra inicialmente, pero comenzaron a evaluar la preparación de la nación para la guerra, incluidos sus recursos médicos y científicos. Cuando Alemania comenzó el incesante bombardeo de Inglaterra, los británicos estaban en extrema necesidad de suministros médicos, incluyendo sangre y plasma para transfusión. En respuesta, se estableció un programa de ayuda, "Sangre para Gran Bretaña". Además de proporcionar una valiosa ayuda a corto plazo a Gran Bretaña, se planificó recopilar la investigación, la experiencia y los datos administrativos necesarios para lanzar un "programa de bancos de sangre" en todo el país si los Estados Unidos entraron en la guerra. A fines de 1940, el Dr. Charles Drew fue elegido como supervisor médico del "Programa Sangre para Gran Bretaña" por la Asociación de Transfusión de Sangre (BTA). El objetivo era ayudar a configurar un programa de prototipo temprano para el almacenamiento y conservación de la sangre. Se establecieron varios bancos de sangre y se hicieron arreglos para que grandes cantidades de plasma fueran llevadas a Inglaterra. El programa funcionó con éxito durante cinco meses (hasta su conclusión en enero de 1941) con aproximadamente 15,000 personas donando sangre y más de 5,500 viales de plasma enviados con éxito a Gran Bretaña.

Palabras clave: Banco de Sangre, Móvil de sangre, Transfusión de sangre.

Surgeon

Department of Trauma, Acute Care Surgery and Surgical Critical Care, Forbes Regional Hospital, Allegheny Health Network, Pennsylvania, USA

Corresponding Author: Saptarshi Biswas, Surgeon, Department of Trauma, Acute Care Surgery and Surgical Critical Care, Forbes Regional Hospital, Allegheny Health Network, Pennsylvania, USA, e-mail: saptarshibiswas@comcast.net

ABSTRACT

At a time when America was racially divided, Dr Charles Richard Drew broke barriers to become one of the pioneer scientists of the 20th century.

His groundbreaking research and innovative developments in the use and preservation of blood plasma during World War II helped save thousands of lives, but also revolutionized the nation's blood banking process and standardized procedures for the preservation and storage techniques for a long period. This was later adopted by the American Red Cross.

Hitler's invasion of Poland in September 1939 marked the beginning of World War II in Europe. American political leaders although had hoped to stay out of the war initially, but started assessing the nation's preparedness for war, including its medical and scientific resources. As Germany began the incessant bombing of England, the British were in dire need of medical supplies, including blood and plasma for transfusion.

In response, a relief program "Blood for Britain" was set up. Besides providing valuable short-term aid to Britain, it was planned to gather the research, experience and administrative data needed to launch a countrywide "blood banking program" if the U.S. entered the war.

In late 1940, Dr Charles Drew was chosen as the medical supervisor of the 'Blood for Britain program' by the Blood Transfusion Association (BTA). The goal was to help set up an early prototype program for blood storage and preservation. Several blood banks were set up and arrangements were made for large amounts of plasma to be flown to England. The program operated successfully for five months, (till its conclusion in January 1941) with approximately 15,000 people donating blood, and over 5,500 vials of plasma successfully shipped to Britain.

Keywords: Blood bank, Blood mobile, Blood transfusion.

How to cite this article: Biswas S. "Foggy Bottom Neighbourhood" Who Went on to Become the "Father of Modern Day Blood Banking": Life and Times of Charles Drew—Surgeon, Researcher, Activist, and Physician Extraordinaire. Panam J Trauma Crit Care Emerg Surg 2018;7(3):189-193.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Charles Richard Drew (Fig. 1) was an American physician and surgeon and a pioneer in medical research whose legacy extends beyond the field of blood transfusion and

Fig. 1: Dr Charles Richard Drew in his lab (*Courtesy:* Charles Drew Papers.)

development of improved blood storage techniques.[1] The application of his expert knowledge to the development of large-scale blood banks which eventually saved thousands of the allied forces' lives during World War II.[2,3] Out of his work came the "American Red Cross" Blood Bank.

EARLY YEARS AND EDUCATION

Born on 3rd June 1904 in Washington DC to a modest carpet-layer and a mother with a teaching degree; he was the oldest of their five children.[4] Neither rich nor poor, his African-American family was well respected in their racially mixed neighborhood. Dr Drew, or "Charley" as his friends called him, demonstrated leadership skills at the early age of 12 by managing a crew of 6 newspaper delivery boys.

He attended public schools and although he achieved less than stellar grades, he excelled at what he was most passionate about at that time: athletics.

At Dunbar high school he was a "four-letter man," the equivalent of what we now refer to as an "all-star athlete," for which he received awards for the all-around athlete in both his third and fourth years. At Amherst College, he excelled as a top athlete for all four years; he was the top athlete in both football and track his junior year. Unfortunately, despite the athletics' department custom of electing the best junior year competitor for senior class Captain, that vile tradition of racism won out, and he was not elected Captain of the football team. To the credit of Amherst students and associates, open criticism of that and previous racist decisions (the two previous top competitors in football had been African-American and were also denied the Captainship) when the track election was held, Drew was rightfully elected Captain of the senior class.[4]

In his 17-year career (nine as a surgeon) Dr Drew made a greater impact in the field of medicine than many who spend a lifetime.[4] Although he had opportunities to attend medical schools in the United States, he chooses instead to pursue his MD at McGill University in Quebec.[5] Many have speculated that the reputation of Canadian schools as more accepting of people of color played a significant role in his decision.[5] This was followed by an externship at Royal Victoria Hospital, and an internship as well as year in residency in medicine at Montreal General Hospital, then a residency in surgery at Freedman Hospital in DC, he went on to become a Surgery Resident at Presbyterian Hospital in New York. Eventually, he completed a General Surgical fellowship at Columbia University. He received a Doctor of Medical Science degree from Columbia (considered by many to be the highest possible degree achievable in academia during the time), in the process becoming the first medical doctorate of African American origin at that prestigious institution.[6]

FATHER OF BLOOD BANKING

While working on fluid resuscitation in shock during his internship and surgical residency at Montreal Hospital (1933–1935) that Charles Drew developed his interest in transfusion medicine.[6]

Racial bias at major American medical centers at that time barred black scholars from their practices. This thwarted Charles Drew from further training in transfusion therapy at the Mayo Clinic.[6] Instead, Dr Drew chose to continue with his surgical career and in 1938, he acquired a fellowship to train with prominent surgeon Allen Whipple at Presbyterian Hospital, NY. Dr Whipple assigned Drew to work under John Scudder, who had received funding to establish an experimental blood bank. However, this prevented him from direct access to patients privileges usually afforded to his white peers.[6]

Drew and Scudder concentrated their research on the diagnosis and management of shock, fluid and electrolyte balance, blood chemistry, preservation, and transfusion.[6] His seminal dissertation, "Banked Blood: A Study in Blood Preservation." Was based on these studies. Scudder described this work as, "A masterpiece" and "one of the most distinguished essays ever written, both in form and content."

Drew's doctoral study involved works on blood chemistry and fluid replacement, transfusion and evaluated factors affecting shelf-life of stored blood. This included a wide gamut from types and amounts of anticoagulants and preservatives, to the optimal temperature. And even storage container shapes.[6]

While doing his interning at Presbyterian Hospital, New York and later pursuing a doctorate at Columbia University, Drew found out blood plasma to possess some unique properties.[7] Plasma is the clear, straw-colored fluid containing various proteins and electrolytes which acts as a carrier for blood cells and other substances.

Plasma can be preserved for a prolonged period without refrigeration contrary to whole blood. Plasma, when agitated during transport, do not break down, has much less probability to transmit diseases, can be used with any other blood type, potentially be injected intravenous, intramuscular and subdermal and in large doses and can be substituted for whole blood in transfusions.[6]

Blood for Britain Project

Hitler's invasion of Poland in September 1939 marked the advent of World War II in Europe. American political leaders had hoped to stay out of the war, but at the same time began assessing the nation's preparedness for war, evaluating its medical and scientific resources.[5]

With the continued bombing of England by Germany (June 1940), the British were in acute need of medical supplies, including blood and plasma.[5] In response, a relief program "Blood for Britain" was set up. Besides providing valuable short-term aid to Britain, it was planned to gather the research, experience and administrative data needed to launch a countrywide "blood banking program" if the US entered the war.[5]

Drew, Scudder and EHL Corwin worked together to scheme the organizational process of collecting, processing and storing large amounts of contamination-free plasma along with methods for extracting plasma and ensuring safe arrival in England.[6] The process of centrifuging and sedimentation was used to separate plasma from blood cells. The plasma was then pooled from a collection of eight bottles using an anti-contamination technique under strict air and ultraviolet lighting conditions, and samples were cultured for bacteria.[6] Merthiolate, an anti-bacterial agent was added to the blood product and batches being tested every week. Each batch diluted with sterile saline solution was transferred to a shipping container and. A sample was taken before the containers were sealed and packed for bacterial contamination.[6] A trial shipment of plasma was sent to England by early August, and the results were deemed"entirely satisfactory."

In late 1940, John Scudder recruited Dr Drew to help set up an early prototype program for blood storage and preservation.[2] Dr. Charles Drew was chosen as the medical supervisor of the 'Blood for Britain program' by the BTA. Several blood banks were set up and arrangements were made for large amounts of plasma to be flown to England.[7] The program operated successfully for five months, (till its conclusion in January 1941) with approximately 15,000 people donating blood, and over 5,500 vials of plasma successfully shipped to Britain.[2]

In 1941. the American Red Cross asked Dr Drew to help establish a blood bank program in the United States which became a model for the Red Cross pilot program to produce dried plasma in New York on a large scale in February 1941, with Drew acting as the assistant director.[6,7] In later years this went on to become a model for the National Blood Donor Service also. These projects established Dr Drew as an eminent expert on blood procurement and processing.

During the height of the war, Dr Drew recognized the immediate and urgent need for blood. "Bloodmobiles" were mobile blood donation trucks (Fig. 2) with refrigerators and Dr. Drew was credited for this innovation.[6,8]

The work enriched his reputation as a spearhead in the field and earned him the title, "father of the blood bank."[9] Charles Drew Institute in Biomedical Services within The American Red Cross is also named in his honor.[9]

SURGERY ALWAYS REMAINED HIS FIRST LOVE

Dr Drew returned to Howard University in late 1941, where he served as Head of the Surgery Department and Chief of Surgery at Freedmen's Hospital till 1950.[6] His motto was to "train young African American surgeons who would meet the most rigorous standards in any surgical specialty" and "place them in strategic positions throughout the country where they could, in turn, nurture the tradition of excellence." Dr Drew considered that to become his "greatest and most lasting contribution to medicine"[6] (Figs 3 and 4).

> "While one must grant at once that extraordinary talent, great intellectual strength, and unusual opportunity are necessary to break out of this prison of the Negro problem, we believe that the Negro in the field of physical sciences has not only opened a small passageway to the outside world but is carving a road in many untrod areas, along which later generations will find it more easy to travel. The breaching of these walls and the laying of this road has not been and is not easy"
>
> —Charles Drew

Fig. 2: Charles Drew with the first mobile blood collecting unit, February 1941 (*Courtesy:* American chemical Society)

Fight for Racial Justice

The Red Cross ironically excluded African Americans from donating blood, making Dr Drew himself not eligible to take part in his self established program.[2] Racism was pervasive even at the national level. The US War Department declared, "It is not advisable to collect and mix Caucasian and Negro blood indiscriminately for later administration to members of the military forces." Later modifications were made to accept donations from blacks. Unfortunately, the institution practiced the policy of racial segregation of blood, throughout the war.[6]

Dr Drew openly denounced this policy as "unscientific and insulting to African Americans." Other forms of discrimination, like the American Medical Association's (AMA's) policy of excluding black doctors, were also challenged.[10] Moreover, Drew actively negotiated with institutions and communities to accept the surgeons he trained, with the goal of wider acceptance and achievement of African American surgeons throughout every aspect of medicine. Despite those protests, segregation of banked blood practiced by the US military continued to as late until 1949.[7] NAACP's prestigious Spingarn Medal was awarded to Dr Charles Drew in 1944.[7]

Fig. 3: As a faculty in Howard with residents. (*Courtesy:* American chemical Society)

Fig. 4: Charles Drew sitting with medical residents at Freedmen's Hospital (*Courtesy:* Charles Drew Papers)

Dr Drew's noble acts did not go unrecognized by our nation as a whole, and the US Postal Service issued a stamp (Fig. 5) posthumously in his honor in 1981.[11]

Death of a Legend

A longstanding myth surrounded Dr Drew's death among African-Americans that the "father of the blood bank" had bled to death after the local predominantly white community hospital refused to treat him because of his race.[10]

Dr Drew and three other black doctors from Howard were driving through Alamance County, rural North Carolina, on their way to a medical conference on 1st April 1950, when their vehicle was involved in an accident.[10]

The car hit the shoulder going at high speed and rolled over; Drew suffered massive intracranial and internal injuries. Drew was taken to the emergency department at Alamance General, a private hospital in Burlington, where white doctors worked with utmost dedication to save his life. Intravenous fluids and plasma were administered, but he succumbed to his severe injuries less than two hours after admission. Dr Drew's colleagues survived almost unhurt.[10]

"The Drew legend was not true, but it reveals a larger truth at the heart of black culture," historian Ms Spencie Love[12] writes; "it demonstrates the continuing psychological trauma of segregation and racism in American life."[10]

Reviewer of 'Stranger than Fact' Charles Dew was apt to conclude" Dr Drew, in life and death, also bore witness to a more human and, a more powerful truth: that in the end all of us are true of "one blood."[10]

CONCLUSION

At a time when America was racially divided Dr Charles Drew overcame all obstacles to become one of the pioneer

Fig. 5: US postage stamp

20th-century scientists. His meticulous research in procurement and painstaking developments in blood plasma use and preservation during World War II helped save thousands of lives.[6]

His methods helped develop the blood banking process of the nation and standardized methods for blood preservation for a long period. These innovative techniques of blood storage were later adopted by the American Red Cross.[6]

THE AWARDS AND APPOINTMENTS OF HONOR

Dr Charles Drew received innumerable awards and positions of honor during his lifetime. Some of the notable ones are cited below in chronological order:[6]

- Appointment as Assistant Director of the First American Red Cross Blood Bank in 1941.
- Appointment as the Chief surgeon at Freedmen's Hospital in 1941 and also Head in of Department of Surgery at Howard University in Washington, D.C.
- In 1942 Dr. Drew received the E. S. Jones Award for Research in Medical Science from the John A Andrew Clinic in Tuskegee, AL.
- Chief of Staff appointment at Freedmen's Hospital in1944.
- In 1944 The National Association for the Advancement of Colored People awarded Dr. Drew the Spingarn Medal for his work on blood plasma.
- Dr Charles Drew received honorary doctorates from Virginia State College in 1945 and Amherst College, his undergraduate alma mater in 1947.
- In 1946 was elected as the fellow of the International College of Surgeons (FICS)
- In 1948 Dr. Drew became the First Black to be appointed an examiner for the American Board of Surgery.
- In 1949 Dr Charles Drew became the Surgical Consultant for the United States Army's European Theater of Operations.

LEGACY OF CHARLES DREW

Dr Drew was honored lavishly at the government and private institutional level. Some of them are cited below.[13]

- A 35¢ postage stamp was issued by the United States Postal Service (1981) in its Great Americans series to honor Dr. Charles Drew
- A bridge in Washington D.C. connecting the Edgewood and Brookland neighborhoods named after him" Charles Richard Drew Memorial Bridge".
- United States Navy named a dry cargo ship "USNS Charles Drew"
- Dr Drew was listed as one of the 100 Greatest African Americans by scholar Molefi Kete Asante in 2002.
- Charles R. Drew Postgraduate Medical School, incorporated in 1966 in California, which later became the Charles R. Drew University of Medicine and Science was named in his honor.
- Numerous health centers and foundations named after Dr Drew. Charles Drew Health Center in Omaha, Nebraska; Charles Drew Science Enrichment Laboratory, Michigan State University, East Lansing, Michigan; Charles Drew Health Foundation, East Palo Alto, California; Charles Drew Community Health Center, in Burlington, NC; Charles Drew Pre-Health Society, University of Rochester; Charles R Drew Wellness Center in Columbia, South Carolina to name a few.
- An all-male freshman dorm at Howard University, Washington D.C was named Charles R Drew Hall.
- A residence in his alma mater at Amherst College was named Charles Drew Memorial Cultural House.
- Numerous elementary, junior, middle, intermediate schools throughout the country bear his name.

REFERENCES

1. Luigimarshall. "Doctor in the house" http://www.nation-news.com/nationnews/news/21743/doctor-house. Added 28 February 2011
2. Authored by Biography.com editors. (https://www.biography.com/people/charles-drew-9279094) Original published date April 2,2014.
3. www.absoluteastronomy.com
4. COBB WM. Charles Richard Drew, M. D., 1904-1950. J Natl Med Assoc. 1950 Jul; 42(4):238-246.
5. The Charles R. Drew Papers: Biographical Information https://profiles.nlm.nih.gov/ps/retrieve/Narrative/BG/p-nid/336
6. Charles Richard Drew. "Father of the Blood Bank." June 3, 1904 – April 1, 1950. Renowned surgeon and pioneer in the preservation of life-saving blood plasma. - American Chemical Society. https://www.acs.org/content/acs/en/education/whatischemistry/african-americans-in-sciences/charles-richard-drew.html)
7. Dr. Charles Drew was a lifesaver through his blood plasma discoveries. www.aaregistry.org/.../dr-charles-drew-was-lifesaver-through-his-blood-plasma-discoveries)
8. Father of Blood Banking | MBC - Memorial Blood Centers; www.mbc.org/About-Us/History/Father_Blood_Banking
9. Dr. Charles Drew, father of the blood bank - American Red Cross ; www.redcross.org/news/article/Dr-Charles-Drew-father-of-the-blood-bank
10. Charles B Dew. "Stranger than fact" .The New York Times. (https://www.nytimes.com/1996/04/07/books/stranger-than-fact.html) Published April 7th,1996.
11. Yancey AG Sr. US postage stamp issued in honor of Charles R. DREW, MD, MDSc. J Natl Med Assoc. 1982 Jun;74 (6):561-565.
12. Spencie Love. "One Blood The Death and Resurrection of Charles R. Drew". Chapel Hill: University of North Carolina Press. Edition 2nd.Publication 02/26/1996.
13. https://en.wikipedia.org/wiki/Charles_R._Drew.