

GIANTS IN NEPHROLOGY

William Osler and investigation on trench nephritis



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Abstract

The first alarming reports about a new disease called "trench nephritis" affecting soldiers of the British Expeditionary Forces in Flanders appeared in British medical press in 1915th. Soon, the Medical Research Council initiated a special research investigation on trench nephritis at St. Bartholomew's Hospital and the results of these studies were discussed during the Royal Society of Medicine meeting in February 1916.

William Osler was invited as one of the four main speakers for this presentation. He had lived in England since 1906 and served as the Regius Professor of Medicine at Oxford. At the meeting, Osler summarizes the clinical presentation of trench nephritis as a sudden appearance of swelling

with rare cases of anasarca. Fever was not a common early presentation in his experience. He found rapid improvement in most of the cases during hospitalization despite "persistence of a large amount of albumin, of blood, and of cast, with increasing high blood pressure, is an unusual combination in the nephritis of civil life, yet that has been common enough in these cases".

He questioned the assumption of a good prognosis in trench nephritis especially in "Cases which are lasting from twelve to fourteen weeks, the chances are that it will become subacute or chronic".

Key words: Trench nephritis, William Osler

Introduction

Diseases were, and still are the major cause of human loses during the wars throughout the ages, from ancient till current times. Not that long ago, during the Civil War in America up to 63% of military service man on Union and Confederate side died due to diseases.

Statistics for the World War I shows, that out of 17.5 millions military service people who died on both side, approximately 10 millions death were still caused by diseases. Half of the American Expeditionary Forces deaths (56,991 out of 116,516) during that World War I were related to diseases, with pneumonia accounted for 83.6%, meningitis 4.1% tuberculosis 2.3%, empyema 1.1%, septicemia 0.6%, and Bright's disease 0.5%.

Special worry for the military leaders is always caused by appearance during the war a new or looking like new disease with unknown consequences to the readiness of the military forces.

A nameless correspondent in Northern France for the British Medical Journal in 1915 [1] described as a "new disease", nephritis with general dropsy, among British soldiers returning from trenches. Subsequently, the word "new" was removed from the description of the nephritis following a short letter to the editor of BMJ [2]. But the epidemiology and clinical course of this nephritis was so greatly different from the one observed in the civilian population that the distinct name of "trench nephritis" was given for this illness. Other trench derived disorders recognized at the time of World War I were "trench fever" (five day fever) caused by bacterium Bartonella quintana and "trench foot", medical condition caused by prolonged exposure of the feet to

damp, unsanitary and cold condition common in trenches.

Trench War (1914-1918)

During the Great War the western front was in stalemate from September 1914 till spring 1918. Trenches, 475 miles long, crossed the France from the Swiss border in the south to the North Sea coast of Belgium. Despite thousands of attempts by the Entente and German troops to cross the lines of trenches they barely moved more than 5 miles in each direction. Trenches were from 6-9 to 25 feet deep, composed of three lines of 150-200 feet apart. The first line was for sentry group, next for the main garrison and the third one for support troops. The "no man land" between the enemies was as narrow as 10 yards, but on average 100-400 yards. Routine trench cycle for the soldiers included 70 days in front line, 30 days in nearby support trenches, and 70 to 120 days staying in the reserve.

Trenches accumulated muddy water during heavy rainfall and required water to be pump out. Rats (brown and black variety), which in millions infested trenches, were more than a nuisance and lice were another never-ending problem.

A letter from the trenches written by the soldier in 1916 describes the life in trenches: I joined the army for adventure and the chance to see new places but... I am living in mud hole, freezing... fear of death. Every day I have spent in these trenches, we have had shells fired on us. The mud brings trench foot with it... your feet swell up sometimes double their original size... Men will often have the foot amputated rather than endure the terrific pain. Trench foot isn't the only illness that is rife amongst sol-

Table 1. Life of William Osler

He was born at Bond Head, Ontario, Canada. The youngest of seven children, His father was an Anglican clergyman. Mother: Ellen Picton	July 12, 1849
Osler entered Trinity College in Toronto, Canada	1867
He transferred to McGill	1870
Osler received MD degree. Mentored by R. Palmer Howard	1872
Travel to Europe: Burdon-Sanderson's Lab at London, Berlin (Virchow), Vienna (Rokitansky), and Paris	1872-1874
Professor of the Institute of Medicine, McGill, Montreal	1876
Professor of Clinical Medicine, University of Pennsylvania	1885-1889
Chief of Medicine, Johns Hopkins Hospital, Baltimore. "Big four" included W Osler, W.Welch (pathology), W.S.Halsted (surgery), and H.Kelly (obstetrics.)	1889-1905
Osler married Grace Gross	1892
Birth of his son, Edward Revere Osler	1895
Regius Professor of Medicine at Oxford, UK	1905-1919
Son Edward Revere killed in Flandres	1917
William Osler died at Oxford of bronchopneumonia, empyema and gastrointestinal bleeding	Dec 29, 1919

diers... Nephritis (kidney inflammation)... are very common ...every single man in this trenches has lice... Masses of bodies are piled up... Rats feed upon the corpses" [3].

William Osler as a Nephrologist

There is no doubt that William Osler (Figura 1) was the most recognized and reverent physician of his time. He left more than 1600 items encompassing medical, philosophical, educational, and historical papers. Despite the fact that many potential readers of this paper are very likely familiar with his biography, and his major achievements, I will briefly reflect upon his life and his contributions to nephrology.

He was born in rural Canada in 1849 (Table 1). Fascinated by the potential of the microscope in the enhancement of science and directed by his teachers he decided to study medicine at McGill University. After finishing a trip to the major European medical centers, a frequent practice at that time for American young physicians, Osler was appointed as a pathologist to Montreal Hospital and as a professor of the Institute of Medicine to teach medical students in the area of pathologic histology. Osler followed Virchow's approach to clinical medicine and used pathology/autopsy findings for an explanation of clinical signs and symptoms. He did over 1000 autopsies at McGill (1874-1884). His introductory remarks to the course of microscopic studies included the statement "in no class of diseases is it of greater service than in the various renal disorder. Here we may not only date the commencement of the affection, and follow it in its progress, but also, very often obtain tolerably certain evidence of the nature of the changes going on in the kidney (1876)". In 1883 he described urinary findings in two cases of "puerperal convulsion or eclampsia gravidarum" and discussed the "peculiarities on the nephritis of pregnancy" such as "rarely any fever, no pain in loins", "the amount of albumen is very large. At least 25% of these patients may have convulsion [4]". Other papers, in the field of nephrology published by Osler,

include topics such as kidney tumors, polycystic kidney, renal cirrhosis, uremic syndrome and collagen vascular disorders. In 1890 Osler published two cases of acute nephritis in typhoid fever [5]. Finally the modern textbook which William Osler published *The Principles and Practice of Medicine* in 1892 deserves special remembrance. He considered chronic Bright disease to be distinct from acute form; subdivided chronic form into various categories and delineated causative factors for some kidney diseases related to gout, lead, atherosclerosis and ageing. During his professional life Osler occupied the most prestigious positions American medicine. He was a

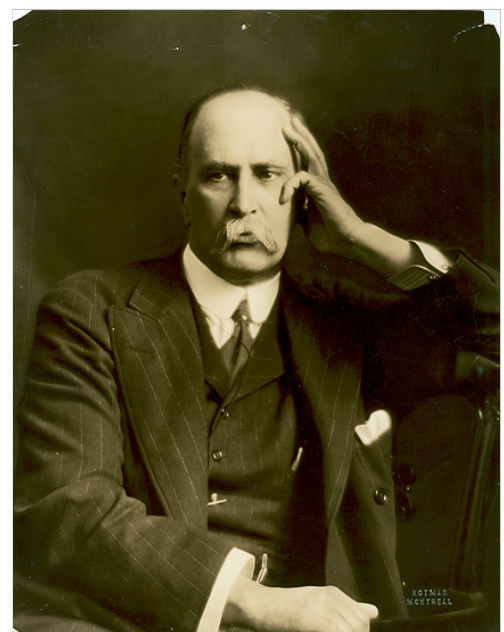


Figure 1. Portrait of William Osler taken at Notman & Son photographic studio during a visit to Montreal in 1909. This was Osler's fourth visit to North America since moving to Oxford in 1905; the primary reason for his visit was to give an oration at the opening of "Osler Hall", the auditorium of the new library building of the Medical and Chirurgical Faculty of Maryland. Montreal was his last stop after visiting Boston, Philadelphia, New York, Buffalo and Toronto. With permission from Osler Library of the History of Medicine, McGill University

professor of clinical medicine at University of Pennsylvania (1885-1889), professor of medicine at John Hopkins (1889-1905) and Regius Professor of Medicine at Oxford in 1905.

Osler Engagement in the War Effort

Osler learned about the eruption of World War I while he was at the sea heading for Canada together with his wife and son. They returned to England on August 22, 1914. Osler strongly supported the British and Canadian war effort. He visited military camps and hospitals, giving lectures and encouraging vaccinations for the military personnel. He was Physician-in-Chief at the Queen's Canadian Military Hospital at Shorncliffe, a consultant to the American woman's auxiliary hospital at Paignton, and served as head physician in Canadian Red Cross hospital [6]. His son initially joined medical unit in 1915 but later asked to be transferred to artillery and was killed by the shrapnel in Belgium on August 24, 1917. Osler was devastated by this news delivered to him by his friend and colleague Harvey Cushing.

Trench Nephritis at the Royal Society of Medicine Meeting, year 1916

Osler was invited for meeting held at the Royal Society of Medicine in February 1916 in London and was one of four speakers at that conference [7]. Dr. W L Brown was the major presenter. He was a leader of the team established by Medical Research Committee to investigate cases of "trench nephritis" in the wards under his care at St. Bartholomew's Hospital in London. He started with statement that during American Civil War in the Central Region the incidence of nephritis was quite prevalent of 0.15% (total of 14,187 cases). There were 1062 cases of trench nephritis observed in the British Expeditionary Forces up to June 1916. WL Brown's personal experience came from a detailed analysis of 58 cases followed at his ward. He considered a different etiology of the diseases including toxic agents, microbial infections and exposure not committing himself to either one. Throat streptococcal infection was strongly considered as a cause knowing association of nephritis and tonsillitis, but he found low level of streptococcal antibodies in his cohort making this option less likely.

The clinical presentation of trench nephritis was not rigorously studied. Some soldiers presented with headache, vomiting, sore throat, marked shortness of breath. Irregular temperature was common occasionally up to 103° F, 24-48 hours ahead of proteinuria.

Edema localized to face and legs was reported at presentation in 53 out of 58 cases. It lasted 4-5 days, sometimes longer. Frequent presentation was dyspnea (pulmonary renal syndrome?). Bronchitis was prevalent, heart was normal on physical examination, but occasional ascites was noted. Volume of urine was variable; often markedly increased; the oliguria was unusual (as opposed to ordinary acute nephritis). Proteinuria mostly was non-nephrotic, non-selective and with frequent macroscopic hematuria (54 out of 58 cases). Renal pathology in few fatal cases show evidence of subacute diffuse nephritis with inflammation and extensive damage to convoluted tubules. By Dr. Brown assessment, the prognosis for recovery seemed to be good. Only one patient out of 58 died, but he worried about possibilities of relapse. As a treatment he suggested to adopt diet poor in nitrogen for a short period of time, but he was against prolonged nitrogen starvation.

He noticed the publication of the bigger study by John R Bradford [8] published in January 1916, which basically confirmed his observations. It was an analysis of 571 out of 1455 cases of trench nephritis treated in base hospitals in England since April 1915 till 1916.

William Osler was the second speaker. He summarized the clinical presentation of trench nephritis based on his personal experience. He found the sudden appearance of swelling with rare cases of anasarca quite typical. Fever was not a common early presentation in his experience. He found rapid improvement in most of the cases during hospitalization but questioned the overall good prognosis for the trench nephritis forwarded by WL Brown.

"Restoration of good health, with the persistence of a large amount of albumin, of blood, and of cast, with increasing high blood pressure, is an unusual combination in the nephritis of civil life, yet that has been common enough in these cases". Specifically "Cases which are lasting from twelve to fourteen weeks, the chances are that it will become subacute or chronic..." "I fear that a considerable proportion of the cases we have at present under observation will pass on to the chronic stage".

The cautionary approach to long term prognosis [9] expressed by Osler did find confirmation in the study arranged by the Ministry of Pension in UK. The observations of 5210 cases between 1920 and 1926 show that complete recovery from trench nephritis occurred in 36% of cases, while 19% had albuminuria, 11% profuse albuminuria, 15% chronic nephritis with hypertension, 12% classic glomerular nephritis and 5.5% hypertension only. Once again the genuine mind and experience of Osler prevail.

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