
Historical Article

THE LIFE AND DEATH OF CAPTAIN CHARLES MARTELL AND KIDNEY STONE DISEASE

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ABSTRACT

Hyperparathyroidism was unknown in this country until the diagnosis was first made by Eugene F. DuBois in 1926. The patient was Captain Charles Martell, a mariner who had become disabled by demineralization of the skeleton during many years. Finally, a parathyroid adenoma was removed at the seventh operation in 1932. Urinary calculi were a major part of the long illness and their complications caused death. Charles Martell contributed significantly to our knowledge of calcium metabolism in general and kidney stone disease in particular.

Hyperparathyroidism, common in the sequential multiple analysis computerized era of 1984, rare in the 1930s and unknown before 1926, first appeared on the medical scene in 1932 when a parathyroid adenoma, retrosternal in location, was found. The patient was a retired sea captain originally diagnosed in 1926 by Dr. Eugene DuBois of an excess secretion by a "parathyroid body".^{1,2} While bone disease and its complications predominated, kidney stone disease was a close second in this victim of the newly recognized malady. The individual involved was Captain Charles Martell, an incapacitated merchant marine officer whose cooperation and courage contributed greatly in that remote dinosaur age to our knowledge of calculogenesis. Although Mandl of Vienna reported removal on empiric grounds in 1925 of a parathyroid tumor from a patient with generalized bone disease, this was unknown to DuBois in 1926. A scattering of operations for excess parathyroid secretion preceded that of Charles Martell in 1932, yet he retains the distinction of being the first case of hyperparathyroidism diagnosed in this country. Let us review the Martell saga.^{3,4}

Born in 1896 in a suburb of Boston, Charles Martell's boyhood was that of any lad on the East Coast early oriented toward the water. In 1914 he entered the Massachusetts Nautical School with an eye to making the merchant marine his career. He graduated 2 years later in 1916 in time to take part in convoy duty in World War I. Soon after the entry of the United States into the conflict Martell became navigator of the U.S.S. *New York* when she was mined off the English Coast. After the North Atlantic service came many voyages on merchant vessels to ports on all continents. During this period Martell obtained his Master Mariner's license so that thereafter he was addressed customarily by the title of Captain.

At the beginning of his seagoing career Charles Martell was the picture of health (fig. 1). A husky, robust, athletic type, he stood 6 feet 1 inch tall. In 1918 he suffered significant pain in the right loin attributed at the time to muscular strain but, in retrospect, it may have been renal in origin. A short time thereafter he noticed the passage of "milky" urine, a portent of the many stones with which he was to be plagued throughout life.

In 1919 his fellow officers kidded Charles Martell about the

fact that he was growing shorter and had a pigeon breast, and he noticed a need to wear a larger collar because the neck was shorter and thicker. He began to sustain long series of fractures after minor trauma about this time, the first being of the patella. Generalized aches and pains originating in the skeleton became prominent. Nevertheless Captain Martell with characteristic spunk continued at sea between hospitalizations. When fractures of both bones of the forearm proved slow to heal a physician in New York pinned the wordy diagnosis of "arthritis of the mixed perisynovial and hypertrophic type" on him, and advised the open air life and hospital care. This prompted retirement by the Captain in 1923 from the merchant marine and admission to the United States Naval Hospital No. 5 on Staten Island. Here the Captain was to spend 2 years dosed with cod liver oil and all manner of substances thought to have a beneficent influence on the laying down of calcium. Another prominent part of the treatment was prolonged traction to lengthen the compressed spine but, nevertheless, after 30 minutes of standing on his feet the patient immediately lost several inches in height due to decalcified vertebrae.

When it was recognized that a generalized disease of the bones existed it was obviously time to call on Dr. Eugene F. DuBois, a prominent investigator who in 1913 had established the first metabolic ward in this country at Bellevue Hospital under the auspices of the Cornell Medical Service. The time was January 1926. Captain Martell was to stay for several months undergoing innumerable balance studies, endocrine trials and dietary shuffling. From all of these studies DuBois and his group concluded that the softening of the bones from demineralization was due to a "hyperactivity of the parathyroid bodies". Since the metabolic ward at Bellevue was to close for the summer the Captain was transferred to the Massachusetts General Hospital for confirmation and "probably removal of one or more of the parathyroid glands". Thus, DuBois and Martell share the distinction of the first case of hyperparathyroidism diagnosed in this hemisphere.

The famous Ward 4 in the original Bulfinch building had been started a few years earlier by James Howard Means, Chief of Medicine at the Massachusetts General Hospital, but in 1926 was carried on ably by Joseph Aub (fig. 2, A) assisted by Walter Bauer (fig. 2, B), a former medical resident under Means. Both men were recognized clinical investigators of distinction who were to be joined later by the legendary Fuller Albright (fig. 3).

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Aub's work on lead poisoning was connected with calcium exchange in the bones. The recently discovered parathyroid extract of Collip was found to elevate the serum calcium and "leach out" the lead. Thus, the Massachusetts General Hospital



FIG. 1. Charles Martell at about 22 years old. Reprinted with permission from the Massachusetts General Hospital News, vol. 31, No. 9, November 1972.

people were well suited to examine Captain Martell, who soon became a favorite with all of the Ward 4 personnel. After further investigation confirmed the opinion of DuBois, Edward P. Richardson, a senior surgeon at the hospital who was well versed in thyroid surgery, was chosen for exploration of the previously untouched neck. Since all of the thyroid surgeons of that day spent more time trying to avoid the parathyroids than in seeking them, it is not surprising that Richardson knew little of the appearance of the normal and nothing of the abnormalities of these small glands. At the conclusion of the first operation the pathologist reported the specimen to be a normal parathyroid. It is likely that at the several surgical procedures to come the remaining normal parathyroids were removed.

A second operation was done a few weeks later. In his report Richardson stated, "No evidence of adenoma of the parathyroid", so it is apparent that here as in all subsequent operations a tumor was the object of the search. Following the negative findings of operation 2 the serum calcium and phosphorus levels, and the excess urinary excretion thereof remained unaltered. Captain Martell left the hospital on a high calcium diet disappointed but not discouraged. He would work for a time as a surveyor for the Marine Insurance Company. Meanwhile, stones on both sides of the upper tract became more troublesome.

In 1931 Charles Martell was crippled to such an extent that he could only get about on crutches and he could not negotiate stairs. After restudy by the Cornell group it was once more believed that he must harbor a parathyroid adenoma. The elevated serum calcium that was the original clue found by DuBois remained persistently elevated in the neighborhood of 14 mg. per cent. Therefore, in May 1932 re-exploration of the neck was performed in New York by Dr. Russell Patterson, another skilled surgeon, and again no tumor was found.

Captain Charles Martell entered the Massachusetts General Hospital for the final time later in 1932. He had lost a full 12 inches in height (fig. 4), and was a pitiful sight leading a bed and chair existence, no longer able to ambulate even on crutches, constantly wracked by pain yet possessed of an indomitable spirit. Martell had long ago become knowledgeable on the parathyroids and took an active part in deciding the next move in the baffling case. He was convinced that the correct diagnosis had been made in New York and in Boston,

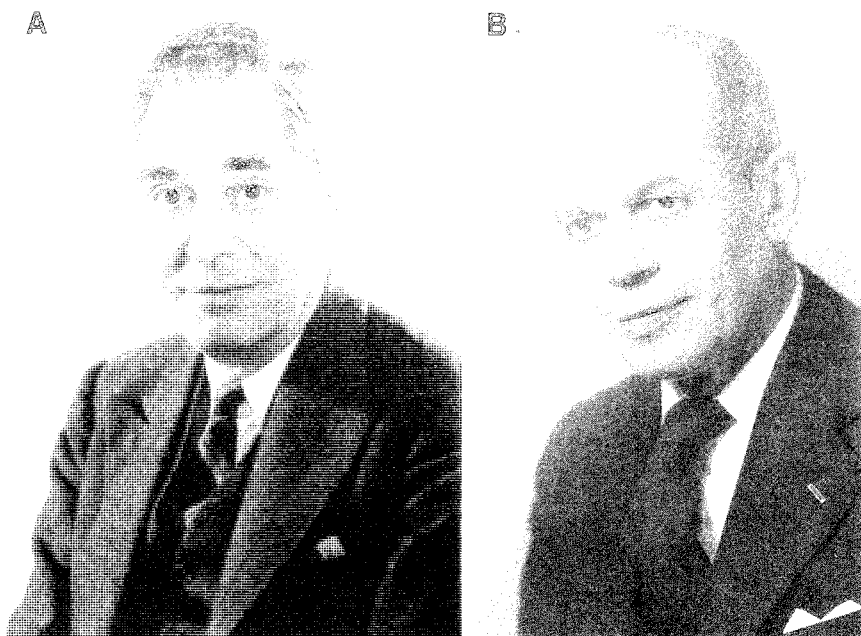


FIG. 2. Joseph Aub (A) and Walter Bauer (B) confirmed diagnosis of Dubois. Reprinted with permission from the Massachusetts General Hospital News, vol. 31, No. 9, November 1972.

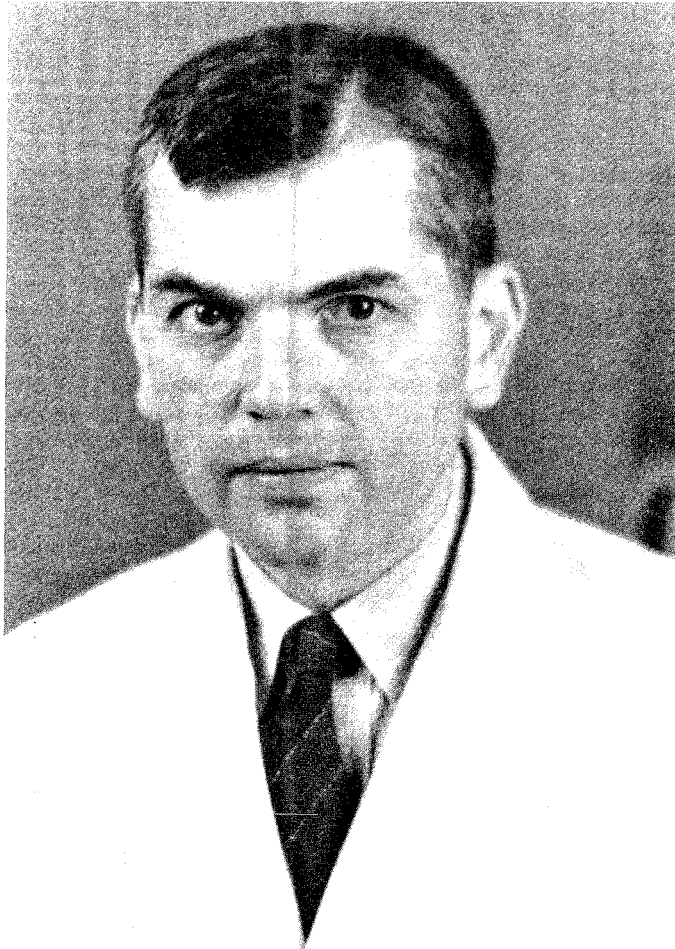


FIG. 3. Fuller Albright, early authority on kidney stone disease. Reprinted with permission.³

and that the only thing to do was to keep looking until the tumor was found. Meanwhile, progress also had been made in the surgery of the parathyroid glands, especially by Oliver Cope⁵ under the tutelage of Edward D. Churchill, Chief of Surgery at the Massachusetts General Hospital.

Thus, at the behest of the Ward 4 contingent of doctors but primarily at the urging of the Captain himself a systematic plan was laid out and followed. A complete re-exploration of the neck was done by Churchill and Cope. Each submaxillary area was scrutinized surgically. All of these procedures were unrewarding yet the Captain's resolve never faltered. On November 2, 1932 an anterior mediastinotomy by Churchill (fig. 5), the seventh operation, revealed a 2.5 cm. parathyroidoma lurking behind the split sternum. After its removal the serum calcium level decreased for the first time to a level so low that tetany soon became a problem.

Although throughout the years the demineralized bones overshadowed all else in Captain Martell's medical history, there is no doubt that the pathological condition of the urinary tract had a significant role in the chronic illness and, in fact, was the proximate cause of death. For example, one notes that a sudden attack of sharp severe pain in the right loin, the most severe pain he had ever experienced, marked the onset of trouble 14 years before its final outcome. This pain, which with its aftermath lasted a week, could well have been renal colic, since not long thereafter he observed "milky" urine, which in all probability was due to excess concentration of calcium crystals. By 1919 he was passing "thick white gravel at the end of urination", which caused severe pain and was to continue intermittently throughout life. On another occasion abdominal pain and vomiting forced Martell to return ashore. By 1932 as

the disease progressed unabated, roentgenograms of the kidneys showed bilateral renal and ureteral stones as well as calcification in the renal parenchyma later to be called nephrocalcinosis. Excretory urograms further showed the right kidney to be atrophic and lacking in function with a total renal function of only 10 per cent by the phenolsulfonphthalein test at the end of 2 hours. This, with elevation of the nonprotein nitrogen to 58 mg. per cent, reduction in carbon dioxide and increase in the chlorides, bespoke a degree of azotemia and hyperchloremic acidosis. (It should be remembered that much of this investigation occurred more than 50 years ago when such tests and their interpretation were relatively new.) Between 1926 and 1932 Martell was fed a high calcium diet in an effort to improve the bones, which, unquestionably, potentiated stone formation.

For a few weeks after the successful operation Charles Short, a brilliant resident from the Medical Service, kept constant watch over the patient. He juggled fluids, electrolytes and the meager supply of Collip's parathormone all with skill. The patient was beginning to look a bit better when the final urological complication occurred—a stone dropped from the left kidney, which was the good kidney since its mate was useless, into the upper ureter where it became impacted. The dire emergency in this acidotic uremic individual was met by G. G. Smith, who performed an expeditious ureterolithotomy leaving in a tube to drain the renal pelvis. Despite the heroic procedure Martell died the following day.

At the autopsy, for which Captain Martell had arranged before death, the important changes in the bone were old fractures, bone cysts, "brown tumors" and "fishbone" deformity of the vertebrae. From the urological viewpoint both kidneys had calcific particles in their substance, which were listed by the pathologist, Dr. Benjamin Castleman, as "renal calcinosis". The right kidney was destroyed essentially with the dilated ureter containing a stone near its junction with the bladder, which undoubtedly was several years in duration. The left kidney also contained several stones. On microscopic exami-



FIG. 4. Charles Martell shows ravages of hyperparathyroidism late in disease. Reprinted with permission from the Massachusetts General Hospital News, vol. 31, No. 9, November 1972.



FIG. 5. Edward D. Churchill found retrosternal parathyroid adenoma at seventh operation. Reprinted with permission from the Massachusetts General Hospital News, vol. 31, No. 9, November 1972.

nation both kidneys revealed the anticipated inflammatory changes as well as the dark blue stain of minute calcific areas in the parenchyma.

EPILOGUE

What lasting benefits resulted from the life and death of Charles Martell? It is abundantly clear that the study of diseases of bone profited immensely with the unraveling of hyperparathyroidism. In regard to urology, among many of the Captain's contributions 2 stand out: 1) the elucidation of 1 specific cause of stone formation that is put to daily use by the practicing urologist and 2) the awakening of Albright's interest in calculus formation. As early as the summer of 1932 Albright began to screen for hyperparathyroidism all patients with kidney stones at the Massachusetts General Hospital. Formal organization of the Stone Clinic at the hospital soon followed, which served as the prototype for other such clinics over the country. The yield was substantial so that Cope (fig. 6) soon collected an impressive series of patients with hyperfunction due to adenoma as well as other pathological lesions of the parathyroid glands, such as the "wasserhelle" syndrome.

Finally, the insistence of Charles Martell himself that the search be pursued to its final victory did much in that time more than half a century ago to confirm the value of research and the role of scientific investigation in clinical problems.



FIG. 6. Oliver Cope, early student of surgery of parathyroid glands. Reprinted with permission from the Massachusetts General Hospital News, vol. 31, No. 9, November 1972.

Captain Charles Martell did well in his role of investigatee and investigator.

ADDENDUM

The original medical records on Captain Charles Martell disappeared from the files of the Massachusetts General Hospital and, hence, this paper has been compiled from the historical data in the references cited, and bits and pieces of personal recollections and communications.

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