


Surgical and Medical Emergencies, 2nd Year Book Medical Publishers, Inc., Chicago.


In this relatively small text the authors define and describe some of the principles underlying surgical diseases on a broad and somewhat superficial categorization of lesions which is somewhat artificial and will not help the average student; for example, as stated in the preface, "Conditions as dissimilar as hemorrhage, ascites, surgical emphysema, fistulas and dehydrations are, as a whole, examples of abnormal movements of fluid in the body and are thus considered together." An example of other conditions that are grouped together is the tetralogy of Fallot, patent trachus, ductus arteriosus, Meckel's diverticulum, and single kidneys. These are considered as "failures of obliteration of fetal pathways", thus are grouped together as examples of a similar pathologic process.

This arrangement of surgical lesions is of little value to a student or to a practicing doctor. The book might possibly be of value to a student preparing for examinations, if the questions were also unanswerable.

The text is well illustrated with pictures and line drawings. The content is interesting; for example, one reads that intracerebral hemorrhage and periferriment has fluid exudate, are considered together as "fluid leakage into the body cavities".

The book is well written, the concepts are new and interesting, but it cannot be recommended for the student or graduate intern, only as an interesting and readable ancillary text for the graduate surgeon. 

1969

HISTORY OF SURGERY

HARVEY CUSHING (1869-1939): A CENTENNIAL APPRECIATION


To study the phenomena of disease without books is to sail an uncharted sea, while to study without patients is not to go to sea at all."

William Osler

Harvey Williams Cushing, the youngest of ten children of Betsy Maria Williams and Henry Kirke Cushing, M.D., was born on the Western Reserve of Connecticut in the town of Cleveland, Ohio, on April 8, 1869. It is a measure of a man's greatness that, 100 years later and more than 30 years after his death, his name is still a byword in medical, and particularly neurosurgical, circles. No apology is made for making another contribution to the legend of Harvey Cushing. Many facets of his life were closely associated with Canada and Canadians. One man, outside his immediate family, who influenced Cushing's life and the subsequent direction it took perhaps more than any other was Sir William Osler. Later when Cushing became a world figure in his own right he was responsible for the training of the first neurosurgeon in Canada, Kenneth G. McKenzie.

Who was this man who introduced the sphyngeanometer to the North American continent and the routine measurement of blood pressure during surgical operations; who, with Amory Codman, drew up the first anesthetic charts as we know them today; who gave his name to a syndrome now produced more often by steroid therapy than by the basophilic adenoma of the pituitary gland that he discovered; who became William Halsted's greatest pupil, transferring the meticulous techniques of this surgeon to the new field of neurosurgery; and who became a first-rate bibliophile and author of one of the great biographies of this century, his "Life of Sir William Osler"?

The milestones in Harvey Cushing's career are well known. He received the best medical education that the United States offered at the end of the last century. He graduated B.A. from Yale in 1891 and transferred to the Harvard Medical School from which he graduated in 1895. He spent a year as a house officer at the Massachusetts General Hospital and then, in 1896, went to Johns Hopkins Hospital and Medical School where he came under the influence of William Halsted and became his resident in surgery. It was at Johns Hopkins Hospital that Cushing first met William Osler and he came increasingly under the influence of that great physician. It was also at Johns Hopkins that Cushing first saw injury to the spinal cord—a barmaid who was shot by her irate husband. He followed her closely as her condition improved and he subsequently re-

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Cushing had established himself as a world figure. His first book, "The Pituitary Body and Its Disorders," was published during that year. After turning down many offers to become professor of surgery at various universities in the United States, he finally accepted an offer to be Professor of Surgery at the Harvard Medical School at the newly built Peter Bent Brigham Hospital. For the next 20 years, with two years out for war service in France between 1917 and 1919, Cushing remained there as Professor of Surgery. A few words about the war years are warranted as they have been so well documented by Cushing himself in his book "From a Surgeon's Journal."

Cushing visited France twice during the war. First, in 1915, he was attached to the British Expeditionary Force for three months, and then he returned again in 1917 after the United States entered the war. On this second occasion he remained in France as Senior Neurological Surgeon for two years. The diary that he kept during this time comprises his book. Some abstracts from it are worthy of note. On August 15, 1917, after describing several serious head wounds, he comments, "They made more serious cases out of us, which is what we want, but I am beginning to be a little doubtful about eight a day if they are all of this magnitude." One of the criticisms levelled against Cushing has been that he concentrated almost entirely on tumours of the brain throughout his life. After reading his war journal, one has no doubt that, in a two-year period, Cushing had more experience with penetrating injuries to the head than any single man could possibly have had before or ever since. Cushing was not exempt from personal crises and one of these occurred on August 30, 1917 in the form of a strange and sad coincidence. He relates how, a few days previously, he had received a letter from Lady Osler telling him that her son's Revere was somewhere near and how dreadful it would be should he be brought in with a head wound. Three days later he received a telegram as follows: "Sir Wm. Osler's son seriously wounded at 47 C.C.S. Can Major Cushing come immediately?" He goes on to describe the shrapnel wounds, "It could not have been much worse, though there was a bare chance—one traversing the upper abdomen, another penetrating the chest just above the heart, two others in the thigh, fortunately without a fracture." He was operated upon by George Crile but he died and was buried the next morning in Flander's Field. Then on January 28, 1918 he writes, "I saw poor Jack McCrae—last night—the last time. A bright flame rapidly burning out. He died early this morning. Just made consulting with the first army—the only Canadian so far to be thus honoured—a soldier from top to toe—how he would have hated to die in bed—an atypical pneumonia with extensive pneumococcus meningitis—they will bury him tomorrow. Some of the older members of the McGill Unit who still remain here, were scouring the fields this afternoon to try and find some chance winter poppies to put on his grave—to remind him of Flander's, where he would have preferred to lie."

**Cushing and Osler**

Osler recognized Cushing's talents shortly after his arrival in Baltimore and it is interesting to record that, at Osler's request, Cushing probably did the first splenectomy for Banti's disease on the North American continent. While in London visiting Horsley, Cushing met Osler and had an opportunity to spend some time with him. It was here that their friendship became firmly cemented. On his return to Baltimore, Cushing moved into a vacant house next to the Oslers and it is a measure of the friendship between the two families that a gateway was built in the fence between their two backyards. Cushing was frequently in Osler's home and Osler's greatest contribution to Cushing was to insist in him a love of books and an interest in medical history. It was due to Osler that Cushing became an authority on Vesalius and, near the end of his life, Cushing began a bibliobiography of Vesalius which was published after his death in 1943. Osler left Baltimore in 1905 to become Professor of Medicine at Oxford University but the friendship was main-
tained with frequent visits by both across the Atlantic. Sir William Osler died on December 30, 1919. Shortly after, Lady Osler asked Cushing if he would write a biography. The biography was completed during the next four years in his "spare time" and the research required was carried out with the accuracy and concentration on details that one might have expected of Cushing. "The Life of Sir William Osler" was finally published in two volumes in 1925. It received immediate and wide recognition and the following year was awarded the Politzer Prize in letters by Columbia University. The last two paragraphs are quoted because they give some idea of Cushing's deep respect for Osler and also illustrate how well Cushing wrote.

"So they—the living—left him overnight; alone in the Lady Chapel beside the famous 'watching-chamber' which overlooks the shrine of the Saint, and with the quaint effigy of his beloved Robert Burton near by—lying in the scarlet gown of Oxford, his bier covered with a plain velvet pall on which lay a single sheaf of lilies and his favourite copy of the 'Religio, comes vitae viae'...

"And perhaps that New Year night saw, led by Rever, another procession pass by the 'watching-chamber'—the spirits of many, old and young—of former and modern times—of Linacre, Harvey, and Sydenham; of John Locke, Gesner, and Louis; of Bartlett, Beaumont, and Bassett; of Johnson, Bovell, and Howard; of Mitchell, Leidy, and Stillé; of Gilman, Billings, and Trudeau; of Hutchinson, Horsley, and Payne; of the younger men his pupils who had gone before—Jack Hewitt, MacCallum, and McCrae; and in still greater number those youths bearing scars of wounds who more recently had known and felt the attraction and warmth of the 'Open Arms'—doubly dead in that they died so young."

CUSHING AND K. G. MCKENZIE

At the end of the war Cushing returned to Boston and, for the next 12 years, saw the fruits of his labours ripe and flourish. It was during this time that many young men who subsequently became eminent neurosurgeons in various parts of the world came to work with and learn from Cushing. One of these men was Kenneth G. McKenize. McKenzie had graduated from the University of Toronto in 1914 and for the next four years had been a medical officer. In 1918 he had bought a practice in Toronto and was also a demonstrator of anatomy. He had tried to persuade Clarence L. Starr, the Professor of Surgery, to help him become a surgeon. In 1922 he was on the point of giving up and had planned to leave Toronto to engage in general practice and surgery in a small community. McKenzie's description of what transpired next to change the course of his life is quoted in full. In 1922, the Charles Mickle Fellowship of the University of Toronto was awarded to Dr. Cushing as the member of the medical profession anywhere in the world who was considered by the Medical Faculty of the University of Toronto 'to have done most during the previous ten years to advance sound knowledge of a practical kind in Medical Art or Science'. Dr. Cushing accepted the award of $1000.00 and requested the University of Toronto to send to Harvard one of its young graduates to work with him for a year. In this way, I became his Resident. During that year Dr. Cushing passed the Mickle prize fund on to me, evidently realizing how helpful financial assistance often is to a young doctor. In this same year, Canada's first neurological surgeon and the founder of the specialty of neurological surgery in this country introduced to the new field. McKenzie did not believe those who told him that there was no need for a neurological surgeon in Toronto, just as Cushing had not believed Halsted 22 years before. McKenzie spent a year in Boston and it would seem that his personality clashed with that of Cushing from time to time. However, McKenzie's subsequent record leaves no doubt that he found in Cushing an admirable teacher, an example and also a friend. For Cushing's sixtieth birthday celebration in 1929 McKenzie contributed to a Festschrift a paper on the treatment of abscess of the brain. At the subsequent birthday party, when Cushing's emotion at the event was on the point of embarrassment, McKenzie jumped onto the table, produced a brilliantly coloured necktie which he hoped would enthrallize Cushing's bright orange favourite and quoted the following lines:

Some may long for the soothing touch Of lavender, cream and mime, But the ties I wear must possess the glare Of a red hot kitchen stove. The books I read and the life I lead Are sensible, same and mild I like calm hats and I don't wear spats But I want my neckties wild.

McKenzie continued to practise in Toronto until his retirement from the University in 1953 and he died on February 11, 1964.

During the years at the Peter Bent Brigham, Cushing's primary interest was tumours of the brain. He always encouraged his residents to keep an "operative score", and he analyzed his own cases in such depth that he was able to place the histopathology and natural history of almost all the tumours of the brain in perspective. As a result of this work, he published books on tumours of the nervous system (1917); tumours of the glioma group (with Percival Bailey 1926); and meningiomas (with Louise Eichardt 1938). In 1931 Cushing operated on his two thousand verified brain tumour which was recorded for posterity on film. The next year he published a book which, as Fulton says, "represents an over-all report on Cushing's life work", under the somewhat clumsy title "Intracranial Tumours: Notes Upon a Series of Two Thousand Verified Cases With Surgical-Mortality Percentages Pertaining Thereto."

In 1932 Cushing retired from active surgery and from his position as Professor at Harvard Medical School. He was promptly appointed Sterling Professor of Neurology at Yale. Here he set up the Brain Tumour Registry, which provided the clinical and pathological correlation of the natural history of the various types of brain tumours. He also began work with Louise Eichardt, his one-time secretary, and subsequently his medical colleague, on the book that is his greatest medical achievement. Having coined the name "meningiomata" for the benign growth of the meninges, Cushing analyzed the natural history of 313 of these tumours. The book, "Meningiomata: Their Classification, Regional Behaviour, Life History, and Surgical End Results", was finally published in 1938. In April 1939 Cushing celebrated his seventy-first birthday. On October 7, just one month after the beginning of the Second World War, the outcome of which he viewed with justified fear and concern, he died of coronary thrombosis. A coincidental finding at autopsy was a small colloid cyst of the third ventricle. It has been said that Harvey Cushing held back the progress of neurosurgery for 15 years. This exaggeration has some foundation for it refers to Cushing's private quarrel with Walter Dandy. Cushing never accepted fully most of Dandy's work, particularly that on ventriculography, which was a tremendous advance in diagnostic technique. The animosity between these two men is one of the regrettable incidents in Cushing's life. Cushing was not magnanimous and did not relish competition. His jealous interest in priority lost him friends, but of his honesty there was no doubt. Cushing's patients had great respect for him and if he understood the operation on them "with some misgivings" (a favourite phrase of his), they knew intuitively that he would, as far as he could, follow his principle "In case one can accomplish nothing, the next most desirable thing is to do no harm." Sir Geoffrey Jefferson sums up Harvey Cushing's character as follows: "The only conclusion that one can reach after making the concessions that honesty compels is that a man may be as near great as mortals can be, in descent in the scientific world, and yet have faults. Obviously it cannot be otherwise."

It is impossible to include all the achievements in Cushing's life. Many of these not already mentioned would have been sufficient for a lesser man. For example, he played a part in the very first use of radiographs on this continent and set up the first x-ray unit at the Johns Hopkins Hospital in 1896. About this time also, Cushing became concerned about the management of acute appendicitis which Fitz had described a few years earlier in Boston. When, in 1897, Cushing diagnosed an acute appendicitis in himself, he implored..."
Halsted to operate quickly. After this, Cushing never lost an opportunity to encourage early operation for this condition. Shortly before his death, Cushing was elected an Honorary Fellow of the Royal College of Physicians of London, the first surgeon ever to receive this honour. Cushing was particularly impressed by the historical import of the occasion. Finally, no appreciation of Cushing is complete without mention of his talent as an artist. Earlier in his life he was a better artist than author but later gave up drawing when he found it easier to express himself in words. However, throughout his life he frequently illustrated his papers, operative notes and letters with his characteristic line drawings.

There have been overwhelming advances in all the scientific disciplines in the last 30 years. By incorporating some of these, neurosurgery has progressed. One would hope that Cushing would take heart from the knowledge that his influence is still felt daily. Whether a writer 70 years from now, composing a centennial appreciation on the death of Harvey Cushing, will be able to comment on the continued effect of his influence is hard to predict. It is the opinion of this writer, however, that Harvey Cushing has established himself in the annals of medical history. He follows in the footsteps of John Hunter, Theodor Billroth and William Osler, as a scientific investigator, a surgeon and founder of a school, and a humanist.

BIBLIOGRAPHY


RENAI HEMODYNAMICS DURING SELECTIVE RENAI ANGIOGRAPHY

The authors studied the effect on renal hemodynamics of an injection of 60% sodium diatrizoate and meglumine diatrizoate (Urograft) into the renal artery of patients undergoing selective renal angiography and dogs. In the animal experiments they observed that, immediately after the injection, there was a definite but variable reduction in renal blood flow as determined by dye-dilution technique. There was no dose-response relationship between the contrast material dose and the renal vasoconstriction. The vasoconstriction occurred even at doses used for selective renal angiograms (2 ml./100 ml. renal blood flow) but was not potentiated with tenfold to fifteenfold increases in dose. The vasoconstriction was generally reversed within 5 to 10 minutes.

During the first 40 seconds after the contrast medium was injected there was a striking increase in the extraction factor of para-aminobenzoic acid. These results point to the postglomerular arteries as the primary site of vasoconstriction.


HUMAN ELECTROGASTROGRAM AT OPERATION: A PRELIMINARY REPORT


Over the past three years at St. Joseph's Hospital, Toronto, we have attempted to define the electrical activity of the human stomach at the time of operation. We studied 205 patients to determine if there were any recordable differences in the rhythmic electrical complexes in various clinical conditions and following gastroscopy.

Smooth muscle cells, like all excitable tissues, are characterized by changes in electrical potential about their membranes, which may be recorded electromyographically. The presence of rhythmic electrical waves in the muscle of the gastric antrum in dogs and humans was reported in 1922 by Alvarez and Mahoney who measured these changes with electrodes applied directly to the external surface of the stomach. Morton in 1954, using swallowed or intragastric electrodes in humans, measured what he believed to be the electromotive force produced by the gastric mucosal glands and by action currents of the gastric muscles. He pointed out diagnostic possibilities of the electrogastrogram.

Bass, Code and Lambert designated the cyclic electrical activity of the gastrointestinal muscle as the “basic electrical rhythm”. In dogs, they noted that spike potentials or fast changes in potential sometimes were associated with the slower waves of the basic electrical rhythm (Fig. 1). The spike potentials preceded visible muscle contractions. The terminology used by workers in this field varies; in this paper we have used those terms that appealed to us as the most descriptive.

In the pyloric antrum of laboratory animals, the slow-wave frequency is three to five cycles per minute (cpm). The fundus, on the other hand, is electromyographically inert. The pylorus, which is defined by Bass, Code and Lambert as the hypomuscular segment interposed between the muscular pyloric canal and the duodenum, is an "electric insulator" and shows no electrical activity. Duodenal electrical discharges appear to be independent of those in the stomach. The duodenal bulb shows irregular electrical discharges. However, beyond the opening of the common bile duct, the duodenal discharges at the rate of 17 to 20 cpm, and the waves decrease in frequency dis-