William Henry Battle and Battle’s sign: mastoid ecchymosis as an indicator of basilar skull fracture

Historical vignette

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William Henry Battle (1855–1936) practiced medicine in England > 1 century ago and is primarily remembered for his description of ecchymosis over the mastoid, which indicates fracture of the skull base. Although Mr. Battle made many contributions to medicine, almost nothing exists in the literature regarding his life and findings, especially in regard to head injury. The following is a review of Battle’s background and his contributions to medicine, specifically his observations associated with basilar skull fractures. (DOI: 10.3171/2008.8.JNS08241)

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William Henry Battle (Fig. 1) was born in Lincoln in the county of Lincolnshire, England, on February 23, 1855. One of 9 children, he was the son of John Richard Battle, who was leader of a prominent Lincolnshire family and served as an alderman, and who went on to become mayor. 4 William Henry Battle was educated at Lincoln Grammar School. He gained his medical degree (M.R.C.S. and L.S.A.) from St. Thomas’s Medical School, London, in 1877, and became a Fellow of the Royal College of Surgeons in 1880. He was elected honorary secretary of the section of surgery of the British Medical Association, of which he was a member. As a surgeon at St. Thomas’s Hospital, he was affiliated with the Royal Free Hospital, and from 1881 to 1885, he edited the St. Thomas’s Hospital Surgical Reports. In 1888, he was selected as assistant surgeon at the East London Hospital for Children. From 1889 to 1890, he held the position of Hunterian Professor in Surgery and Pathology at the Royal College of Surgeons jointly with William Watson Cheyne, John Langton, and Walter Pye, and he also taught in the Medical School for Women, where he had the position of Demonstrator in Practical Surgery.

Battle was the first to report a laparotomy to relieve intestinal obstruction caused by postoperative adhesions. In 1895, he described a vertical incision of the abdominal wall with retraction of the rectus abdominis muscle medially, and in 1901 he detailed his operation for femoral hernia. With the collaboration of Mr. Edred Corner (Surgeon at Great Ormond Street Hospital for Sick Children), Battle published Clinical Lectures on the Acute Abdomen in 1911. Also with Corner, Battle wrote and published The Surgery of the Diseases of the Appendix Vermiformis and Their Complications, which was well received, prior to World War I. Both of these books went on to second editions. Interestingly, Battle believed that an increase in the number of cases of appendicitis in the early 1900s was due to the wide use of steel-rolled flour in America that occurred during this time. 1, 3 Battle was commissioned into the Royal Army Medical Corps and served as major and then Lieutenant Colonel, first with the 3rd and then later with the 5th London General Hospitals (St. Thomas’s).

Battle also researched head injury specifically, associated optic neuritis, cranial nerve injury, and associated cutaneous stigmata. Battle is most remembered for his “sign” (postauricular ecchymosis as an indication of
fracture of the base of the skull) (Fig. 2). Other eponyms that are found in the literature include the Battle incision, a surgical incision used in appendectomies that uses temporary medial retraction of the rectus abdominis muscle (see above), and the Battle operation, an operation for femoral hernia repair.

Regarding his observations of mastoid ecchymosis and its association with basilar skull fracture, he first announced his findings while lecturing to the Royal College of Surgeons in 1890. He also described other findings associated with fractures of the skull base, including otorhinorrhea, periorbital hematoma (raccoon eyes), and subconjunctival hemorrhage. Interestingly, and as pointed out by Battle himself, his investigations actually followed those earlier observations made by the surgeon Sir Prescott Hewett (1812–1891), who had stated:

"extravasation of blood, and consequent discolouration of the skin, appearing in the mastoid region some hours after a severe injury to the head, may lead to the suspicion of a fracture involving the posterior part of the base; and all the more valuable will this become if the injury did not bear directly upon this region, and especially if it bore upon the opposite side of the head".

Battle added to such descriptions by describing the detailed anatomy that was involved with such hemorrhage (Fig. 3). He found that such bruising became apparent between the 3rd and 14th day after head injury, and he described this finding in ~17 cases and in multiple postmortem examinations. He conducted research on cadavers by injecting the occipital musculature and observing for fluid (water, Berlin blue, and glycerin) spread into adjacent tissues (Fig. 2). Such experimentation proved his theory that extravasated blood moves from the suboccipital region to the more superficial tissues. Battle also concluded that the posterior auricular artery appeared to be placed so that its pulsations would help propel hemorrhage into these tissue planes. His first description of a patient with mastoid bruising was in a 41-year-old man who had fallen and received a scalp wound over the left parietal bone.

“He was admitted into hospital unconscious, bleeding freely from the ears and nose. On the fourth day, there was ecchymosis behind the left ear, from which flowed clear watery fluid … over this area there was much tenderness.”

Battle said the following about his “sign.”

“I must ask you to consider this sign somewhat fully, for I consider it, under certain circumstances, to be a most important indication that the posterior fossa of the skull is the seat of the fracture…” “… it is very apt to be overlooked, as the ear conceals it, especially if the ear is large or the head of the patient has not been shaved…” “… it [mastoid ecchymosis] appears, in the first place, in front of the apex of the mastoid process. That it [sic] often spreads upwards over the mastoid in a line, slightly curved, and with the convexity backwards, its direction being approximately that of the outline of the external ear, from which it is distant half to three-quarters of an inch.”
Sir Cuthbert Wallace, P.R.C.S., stated in Battle’s obituary, which was printed in the British Medical Journal on February 15, 1936:

“Every surgeon has attributes by which he is remembered by those that he taught. In thinking of Battle the one thing that stands out in my memory was his devotion to his duty, as shown by his regularity of attendance at St. Thomas’ on his hospital days. Nothing seemed to interfere with his hospital work and a student was sure to find him in his ward at the appointed time and was equally sure of having a profitable afternoon. His teaching was simple, clear, direct and seemed to supply just what the student wanted. This resulted in his having a large following whenever he appeared. He had a wide knowledge of the literature of his subject and no doubt his constant writing for the journals crystallized useful data in his mind and enabled him to distinguish facts from theories much to the advantage of those he taught. As a surgeon he may be described as sure and safe rather than brilliant. As an operator he was neat, quiet, and without fuss. Many men still practicing must have grateful thoughts of Battle.”

Aside from his academic pursuits, Battle enjoyed shooting and golf and was an avid bird watcher who was able “to identify every bird by its name and call.” Mr. Battle served on the editorial staff of the Lancet for more than 20 years, and on February 2, 1936, he died at the age of 81 years.

Disclaimer

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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