Bilateral Subdural Empyema

Report of a Case with Arteriograms


A review of the literature since 1956 has failed to reveal an example of bilateral subdural empyema. Keith, however, in 1949 reported 7 cases of subdural empyema. In 1 of these the lesion was definitely bilateral and the patient made an excellent recovery following the use of drugs and irrigations of penicillin to the subdural space. Ikeda and King reported a case of bilateral subdural hematoma with concurrent Escherichia coli meningomyelitis. They removed the left hematoma initially and the right hematoma 6 days later. No antibiotics were used locally and the patient expired 12 days after the second operation as a result of fulminating meningitis and necrosis of the brain.

Niebeling reported 3 cases from the literature and 1 of his own in 1959. His case was caused by Streptococcus hemolyticus as an extension of facial erysipelas. One burr hole was used for evacuation and although penicillin and Chloromycetin were used systemically, no local antibiotics was used during operation. The patient died on the 9th postoperative day. Of the 3 cases Niebeling found in the literature, all were unilateral. Two patients died of the disease but the patient of von Peters operated on in 1946 was still living 3 years after operation. von Peters' case involved an 8-year-old child with a parieto-occipital fracture in whom headache and spasticity developed 5 months after injury. A unilateral subdural empyema was drained and after a septic course, repeated drainage was done 1 month later. No mention of antibiotics was made.

Browder mentioned 1 case of unilateral subdural abscess following a compound fracture of the skull into the middle ear. He stated this was the only example of subdural abscess subsequent to trauma he had ever observed. After unroofing the abscess he reported the patient recovered.

Dandy wrote of subdural abscess as an unusual form of intracranial abscess. In his experience hemagenous origin from a distant focus was rare. He found meningitis and cerebral abscess to be the most common complications and recommended treatment in these cases with a rubber drain in the subdural space.

Case Report

J.F., a 35-year-old soldier, was knocked from his bicycle by a truck on Oct. 25, 1961. Examination by a physician at a local dispensary revealed the patient to be comatose with no localizing signs. He was immediately sent to a U.S. Army hospital where emergency operation was done which consisted of removal and drainage of a large retroperitoneal hematoma and re-anastomosis of an avulsed neck of the bladder. The following day the patient was noted to be increasingly lethargic. A dilated left pupil and a positive left Babinski's sign were found and the patient was evacuated to U.S. Army Hospital, Landstuhl for neurosurgical care.

Examination. The patient was a well developed male who was disoriented as to time and place. Pulse rate was 90 and regular. Blood pressure was 138/104. The left pupil was larger than the right but reacted well to light. The left Babinski's toe sign was positive. There were signs of a recent laparotomy with paralytic ileus. Drains in the suprapubic region and flank were in place as well as suprapubic and urethral urinary catheters.

Course. The patient's mental status improved gradually. By October 30 the pupils were equal and toe signs were normal. He then was transferred to the Urology service for further care of his bladder and urethral injuries. Attempts to remove his urethral catheter were followed by urinary retention caused by urethral strictures. By Christmas 1961, however, he was doing so well he was allowed to spend the week-end out of the hospital with his family. During the month of January he required frequent urethral dilatations and began to run a febrile course. Cultures of the urine revealed Aerobacter species, Escherichia coli, Pseudomonas and Proteus species.

Toward the end of January he began to complain of intermittent headaches. By Feb. 1, 1962 the headaches had become constant and on February 6 neurosurgical consultation was requested.

Re-examination on Feb. 6, 1962 showed a disoriented patient complaining wildly of severe headache. The left pupil was larger than the right. The left Babinski's toe sign was positive. His neck was supple. Rectal temperature was 102° F. Lumbar puncture yielded clear fluid under abnormal pressure. On Feb. 7, 1962 bilateral percutaneous carotid arteriography (Figs. 1 and 2) showed pronounced posterior shift of the anterior cerebral arteries without lateral displacement. The carotid siphons were compressed. A pre-operative diagnosis of bilateral subdural hematoma was made.

Operation. On Feb. 7, 1962, under general endo-

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tracheal anesthesia, a large bifrontal osteoplastic bone flap was reflected through a coronal skin incision. The dura mater appeared tense bilaterally. On reflecting the dura mater from the convexity of the right frontal fossa a reddish-brown membrane was exposed. Incision of this membrane allowed the sudden escape of approximately 150 cc. of thick yellow-brown pus. The same procedure on the left side yielded 900 cc. of similar pus. Cultures were made for sensitivity studies and immediate Gram staining of smears yielded gram-negative bacilli. Following collapse of the membranes, it could be seen that these were the outer layers of subdural sacs. Their thickness pointed to considerable chronicity. These sacs covered the convexities, and medial and basal surfaces of both frontal lobes. They communicated with each other behind the anterior portion of the falx. The inner layers of the sacs were detached easily from the underlying arachnoid and were removed totally. The subdural space was lavaged with copious amounts of sterile saline solution and then with chloramphenicol solution (1 gm. per 200 cc. normal saline). The dura mater was closed, the bone flap was replaced and the skin was closed without drainage. Thorough irrigation with chloramphenicol solution was carried out at each layer of the closure.

Pathologic Report. "The tissues consist of hyaline fibers, fibroblasts and acute inflammatory cells, B&B stain does not reveal bacteria."

Postoperative Course. Cultures made from the subdural empyema at operation grew Klebsiella species. Systemic penicillin and chloramphenicol were started immediately postoperatively. The patient rapidly became afebrile and remained so. His anisocoria, positive toe sign and mental disorientation disappeared by the 6th postoperative day. On this day a right-sided subgaleal swelling was aspirated and 20 cc. of dark-brown fluid were obtained. Staphylococcus aureus was cultured and Staphcillin added to the antibiotic regimen. The wound healed well and antibiotics were discontinued on the 14th postoperative day. A left carotid arteriogram on Feb. 20, 1962 was normal. Psychological testing 2 weeks after operation revealed a 10 per cent loss of higher memory and abstraction when compared to his Army induction tests 12 years earlier. He still requires an indwelling catheter but the amount of residual urine is decreasing steadily.

Discussion

The exact source of the Klebsiella found in the subdural empyema cannot be determined. Klebsiella, however, is a common urinary contaminant. With the history of infection of the urinary tract followed by a relapse in his neurological status it is reasonable to assume that the urethral dilations produced a Klebsiella bacteremia and subsequent implantation into bilateral subdural hematomas. Although the empyema was encapsulated there was spillage of pus at the time of operation. It is felt that the use of antibiotics locally contributed strongly to his benign postoperative course. In such cases, when antibiotics are used locally, we have not found it necessary to remove the bone flap.

Summary

A case of bilateral encapsulated subdural empyema is presented. Klebsiella, the recovered organism, was probably introduced into the subdural space via the blood stream from the urinary

Fig. 1 (left). Pre-operative arteriogram showing posterior displacement of anterior cerebral artery and compression of carotid siphon.

Fig. 2 (right). Pre-operative arteriogram with midline position of anterior cerebral artery evident.
tract during urethral instrumentation. The striking changes in the pre-operative arteriograms are reproduced.

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References