Extensive Spinal Epidural Abscess Treated by Laminectomy and Hypothermia

Case Report

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It was Hippocrates (460–377 B.C.) who said "Extreme remedies are very appropriate for extreme diseases." The following case delineates the clinical course of a young marine who when first seen by the Neurosurgical Service was in critical condition with quadriplegia caused by an extensive confluent spinal epidural abscess. He was both febrile (107°F) and toxic. Treatment consisted of decompressive cervical, thoracic, and lumbar laminectomy and concomitant hypothermia with excellent, although unfortunately not complete, relief of the quadriplegia.

Case Report

A 17-year-old private in the U. S. Marine Corps was admitted to the Naval Hospital, San Diego on March 12, 1963 because of fever of undetermined origin. He had been in excellent health until 4 days previously. At that time, while on the rifle range, he first noted pain in the low lumbar area of his back when he assumed the sitting position. This low-back pain became increasingly severe and 2 days prior to admission it was noted that he was feverish, for which a wide spectrum antibiotic (tetracycline) was administered. Roentgenogram of the chest was normal. His throat was moderately inflamed and culture at that time yielded a beta Streptococcus. Because of the increasing severity of the pain in the back he was admitted to the Naval Hospital. Past history and review of systems were noncontributory. He had had no abrasions, contusions, or history of furunculosis or recent infections.

Examination. He was an acutely ill male with a temperature of 104.4°F. His neck was supple but there was inflammation of the pharynx with a purulent postnasal drip. Heart and lungs were normal except for tachycardia. There were no murmurs. There was an erythematous rash which blanched on pressure over the trunk and both upper extremities. There was no significant adenopathy. Neurological findings were described as "physiological." Laboratory studies revealed a hematoctrit of 42. Count of white blood cells was 18,650 with 88 per cent neutrophils. Sedimentation rate was 65 mm. per hour corrected.

The clinical impression, in view of the fever, sore throat, and erythematous rash, was of rubeola and initial treatment was entirely symptomatic.

Course. He did well initially on this regimen, the fever receding in 3 days. On the 2nd hospital day, however, he had cellulitis of the right foot. Blood culture revealed no growth. Antibiotic therapy consisting of procaine penicillin, 600,000 units twice a day, and streptomycin, 0.5 gm. every 12 hours, was initiated on the 4th hospital day.

On the 6th hospital day the patient complained of a stiff neck and generalized malaise. The cellulitis was receding from the right foot. No splinter hemorrhages or petechiae were seen. Because of the stiff neck a spinal puncture was performed. The spinal fluid was slightly cloudy with an opening pressure of 280 mm. It contained only 23 cells per c.mm., including 5 red blood cells, 7 polymorphonuclear leucocytes, and 11 lymphocytes; total protein was 100 mg. per cent; sugar was 69 mg. per cent. Blood sugar taken at the time of lumbar puncture was 145 mg. per cent. A Queckenstedt test was not performed. Smear and culture of the spinal fluid revealed no organisms. It was felt that the most likely diagnostic possibility was that of meningitis, and the absence of bacteria in the smear was explained by the fact that he had been given antibiotics for 3 days prior to the spinal tap. Acute and convalescent serum on March 30 and again on April 4 was reported as negative for viral pathogens.

On the 7th hospital day flaccid paraplegia was first noted, accompanied by hyperreflexia and fasciculations of the muscles of the upper extremities. The diagnosis of transverse myelitis caused by infection was considered by the attending physicians. Spinal tap on the 10th hospital day revealed a very slow flow of thick, cloudy fluid which clotted upon standing. The opening pressure was recorded as 100 mm. and there was only a very slow rise of spinal-fluid pressure with bilateral compression of jugular vein with a manometric cuff. The spinal fluid contained 3,461 polymorphonuclear leucocytes and 747 lymphocytes per c.mm.; protein was 1,775 mg. per cent. Again, no growth was reported on culture.

On the afternoon of the 10th hospital day, the patient was seen in neurosurgical consultation. The following findings were present: The patient was extremely febrile with a temperature of 107°F, toxic and quadriparetic. There was marked tenderness to palpation at the level of the 7th cervical vertebra. Total paraplegia and marked weakness of the upper extremities were present. He had a complete sensory level (anesthesia) from C8 inferiorly bilaterally and sensory hypalgesia between C5 and C8. The biceps and triceps reflexes were hypactive but equal. There were no fasciculations of the muscles. Superficial abdominal reflexes and cremasteric reflexes were absent, as were both patellar and

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Achilles reflexes. Babinski's sign was not present. It was the neurosurgical consultant's opinion that this condition probably represented a transverse myelopathy caused by an extradural abscess, and immediate myelography was undertaken. Upon insertion of a No. 18 spinal needle in L2 interspace, approximately 5 cc. of thick yellow pus were encountered. There was no evidence of spinal fluid. Two cc. of Pantopaque were instilled and anteroposterior (Fig. 1) and lateral (Fig. 2) roentgenograms revealed that the Pantopaque had entered a lobular cavity of an abscess at the level of the 3rd lumbar vertebra, extending into the paraspinal musculature. A cisternal tap then was performed with a No. 20 needle with the patient in the sitting position and 2 cc. of intracisternal Pantopaque were instilled. This revealed a complete block at the level of the 4th cervical vertebra (Fig. 3). The spinal fluid in the cisterna magna was slightly cloudy but not grossly purulent.

Operation. Under general anesthesia, with the patient on a Foster frame the entire cervical, thoracic and lumbar areas of the back were prepared and draped. Because of the marked hyperthermia (107°F.), the patient was packed in ice in an attempt to combat the deleterious effects of the extreme hyperthermia and also to reduce metabolism of the central nervous system. Temperature of 97°F. was achieved and maintained throughout the surgical procedure. Through vertical midline incisions a laminectomy from C3 through C6, T6 through T9, and L3 through L5, was performed. In the cervical area free pus was encountered in the epidural space that was thick and yellow and had the gross appearance of Staphylococcus aureus. This had caused a complete block at the level of C4. In addition to the liquid purulent material, older epidural granulation tissue was present completely surrounding the dural sac, much thicker posteriorly than laterally. The same situation was encountered in both the thoracic and lumbar areas. In the lumbar area, however, an additional finding was that of free pus in the epidural space that had dissected through the interlaminar spaces into the paraspinal musculature on the left side, forming an abscess cavity under the lumbodorsal fascia. This cavity contained approximately 200 cc. of thick yellow pus and was encountered as soon as the thoracolumbar fascia was opened in that area. It was decided not to open the dura mater in any operative site. After wide decompressive laminectomy had been performed in each of the three operative sites, No. 8 Davol tubes were passed epidurally, both cephalad and caudad in each of the locations. These tubes then were irrigated with a solution containing 500 units of bacitracin per cc., and were allowed to remain in place. The operative wounds then were packed open, utilizing "adaptive" gauze packing on the free surfaces of the muscles. Retention sutures of No. 8 stainless-steel wire with Davol tubing cuffs were placed in the wound but the retention sutures were not tightened at the time of operation. The estimated loss of blood through the entire procedure was 4,000 cc. and the patient received 8 units of whole blood during the procedure.

Course. A postoperative tracheostomy was performed. His general condition was good. A temperature of 97°F. was maintained by hypothermic measures for the first
6 postoperative days and then gradually allowed to return to normal. He required several blood transfusions during his convalescence and was given antibiotic agents, vitamins, anabolic agents, and a high-protein diet. The bacterial cultures from the operative specimen of epidural abscess yielded Staphylococcus aureus sensitive to Chloromycetin, tetracycline, and Staphicillin but resistant to penicillin and streptomycin.

Antibiotic therapy at this time consisted of 6 gm. of Staphicillin intravenously each 24-hour period for 20 days. He also was given streptomycin, 0.5 gm. twice a day. As soon as the studies of bacterial sensitivity were received, streptomycin was discontinued and Chloromycetin, 250 mg. every 6 hours for a period of 17 days, was initiated. He also received aqueous penicillin G, 20,000,000 units daily, intravenously for the first 20 postoperative days.

On this regime there was a gradual and encouraging improvement in his neurological signs. By the 3rd postoperative day his sensory level dropped to T10. By the 10th day strength was returning well in the upper extremities. By the 15th day the sensory level had descended to the iliac crest and there was a spotty return of sensation in both lower extremities. During this time the wound was irrigated every 6 hours with a solution of bacitracin and topical Staphicillin containing 50,000 units of bacitracin per 100 cc. and a gm. of Staphicillin per 100 cc. On the 18th day all dressings were removed from the wound and the steel retention sutures through the muscles and fascia were approximated. The wounds continued to heal nicely, the muscle and fascia thereafter healing per primam. By the 30th hospital day the 3 laminctomy wounds had completely granulated to the surface of the skin.

Neurologic reevaluation indicated that he was able to move the upper extremities extremely well. The deltoid, biceps, and triceps muscles were normal, considering that there was some general weakness because of the prolonged infirmity. Handgrip as measured on the dynamometer was 260 in both hands. There was no longer a sensory loss in the upper extremities and, in addition, he was able to feel pinprick, temperature, vibration, proprioception, and two-point discrimination in the lower extremities although sensation of pinprick was decreased slightly. The biceps and triceps reflexes were equal and hyperactive. The left knee reflex was present, the right absent. Both ankle reflexes were absent. He no longer required an indwelling Foley catheter but utilized an external catheter. Strength was fair in the quadriceps and hamstring groups of muscles in the left lower extremity and poor in the right lower extremity. There has been as yet, no volitional return in the tibialis anterior, gastrocnemius, and peroneal groups of muscles bilaterally.

Discussion

The use of systemic antibiotics alone without adequate decompression and drainage has no place in the therapy of paraplegia caused by compression of a spinal epidural abscess. This is one of the true neurosurgical emergencies. The medical literature is replete with reports of the deleterious consequences of delaying surgical therapy in this condition.1--8 The only treatment for pus under pressure in the spinal epidural space, as elsewhere in the body, is adequate incision and, whenever possible, dependent drainage. Following this, topical instillation and systemic administration of antibiotics may also be utilized.

Summary

A case of quadriparesis caused by an extensive confluent spinal epidural abscess, treated by cervical, thoracic, and lumbar decompressive laminectomy and hypothermia, is presented.

References