Transoral removal of a fractured odontoid process

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The transoral approach to the upper cervical spine was used with the cooperation of several specialists in a multidisciplinary effort to solve a complex problem.

Specialization within the health professions has provided higher quality medical and dental care. Specialization has also emphasized the advantage of a multidisciplinary approach when more complex medical and surgical problems are encountered. Appropriate consultation is the problem-solving tool available to the specialist when such a problem arises. This report describes an instance when the oral and maxillofacial surgeon and the neurosurgeon combined energies to solve a complex problem efficaciously.

Report of case

A 50-year-old white woman had a history of excessive use of alcohol and frequent traumatic episodes. On May 12, 1975, the patient came to the emergency room of the Long Beach Veterans Administration Hospital with severe pain in the left hip and inability to walk, as she had fallen approximately five hours earlier.

The medical history disclosed a cerebrovascular accident on the right side with residual left paresis and multiple fractures of the long bones. Two months before the current admission, the patient sustained a cervical sprain and was wearing a cervical collar. The history also showed excessive use of alcohol and an allergy to penicillin. The patient smoked more than two packages of cigarettes and drank more than a quart of gin daily.

Physical examination

Physical examination disclosed a poorly developed, malnourished patient who appeared much older than 50 years. Her blood pressure was 160/80 mm Hg; pulse, 80/min; and respirations, 20/min. There were multiple spider nevi and loss of skin turgor over the upper part of the thorax. No jaundice or other lesions were noticed.

Examination of the head, eyes, ears, nose, and throat was noncontributory. The cervical collar was removed from the neck which was supple, nontender, and had a normal range of motion. Results of examination of the heart and lungs were within normal limits; the abdomen was soft and nontender, with active bowel sounds. The liver was palpated as a firm, nodular, nontender mass approximately 5 cm below the right costal margin. Neurologic examination disclosed that the cranial nerves II to XII were grossly intact, and deep tendon reflexes were functioning normally. The lower part of the left leg was 2 cm shorter than the right with internal rotation. Paresthesia was noticed over the left ulnar nerve.

Results of laboratory tests showed SMA-12 within normal limits. The SMA-6 disclosed sodium, 133 mEq/liter; chloride, 79 mEq/liter; and blood urea nitrogen, 5 mg%. Carbon dioxide and potassium were within normal limits. The complete blood cell and differential counts showed red blood cells decreased to 3.55 million with hemoglobin, 12 gm/100 ml, and hematocrit, 35%. Red blood cell indexes were within normal limits, except for an elevation of the mean corpuscular volume to 104 cu μ. The white blood cell and differential counts were within normal limits. Urinalysis showed a specific gravity of 1.015, pH of 5.0, and a microscopic examination showed negative results for cells and casts. A radiograph of the chest disclosed no active disease; the electrocardiogram showed sinus rhythm with occasional premature ventricular contractions. Radiographic examination of the left hip disclosed a comminuted subtrochanteric-intratrochanteric fracture (Boyd's type III).

Treatment

Treatment consisted of rehydration during the first 24 hours. On May 13, the patient was taken to the operating room where an open reduction of the fracture of the left hip with internal fixation was performed. The postoperative course was uncomplicated, and the patient was ready for transfer to the department of rehabilitation medicine on the seventh postoperative day. Before the patient was transferred, radiographs of the left hip and cervical spine were obtained. The reduction of the fracture was adequate; however, films of the cervical spine showed a fracture dislocation of C-1 and C-2 and posterior displacement of the odontoid process against the spinal cord.

On May 22, the patient was transferred

to the neurosurgery service where cervical traction was placed with Gardner-Wells tongs and 5 lb of traction. During the next six weeks, traction was increased to 10 lb with no improvement of the fracture dislocation shown on the radiographs. Therefore, on July 2, a posterior bony fusion of C-1, C-2, and C-3 was accomplished with a graft from the iliac crest. Traction was maintained with Crutchfield tongs and 7½ lb of pressure. The postoperative course was uncomplicated. Unfortunately, however, the odontoid process remained persistently unstable. It was believed that, because of the patient's history, removal of the dens was indicated to allay the risk of compression of the cord. The transoral route was chosen for its direct access.[1] At that time, consultation with the oral and maxillofacial surgery department was obtained.

Preoperative culture and sensitivity tests were obtained on the nasal, oral, and pharyngeal secretions to facilitate appropriate antibiotic coverage. Normal flora that were sensitive to erythromycin were found.

On Aug 6, erythromycin (500 mg, every six hours) was given; the next day, the patient was taken to the operating room. A tracheostomy was performed. Access to the pharyngeal cavity was obtained with a McIvor mouth gag. Visualization of the posterior pharyngeal wall, however, was obstructed by the soft palate. A transpalatal suture placed through a 2-cm section of a no. 10 Red Robinson catheter was used to reflect the soft palate superiorly into the nasopharynx, thereby gaining adequate visualization of the superior pharyngeal region (C-1 through C-2 level). The suture was secured around the columella. With use of a Zeiss microscope, an incision in the midline of the posterior pharyngeal wall was made, and the anterior arch of the atlas and the body of the axis were exposed. A portion of the anterior arch was removed with a Hall drill to allow exposure of the displaced odontoid process. With Cloward bone punches, a Hall drill, and sharp curettes, the mobile segment of the dens was freed from the fibrous dural covering of the cord. The wound was irrigated with antibiotic irrigant (bacitracin, neomycin sulfate, and polymixin-B sulfate) and was closed with interrupted no. 3-0 polyglycolic acid sutures. The mucosa was closed with a no. 3-0 polyglycolic acid continuous horizontal mattress sutures.

The patient received nothing by mouth for the first five postoperative days during which time fluids were administered intravenously, and the wound received constant oral antibiotic lavage. Edema was minimal. On the tenth postoperative day, the tracheostomy tube was removed, and the antibiotics were discontinued. The patient continued to improve and in the third postoperative week was transferred to a nursing care facility.

Discussion

The transoral approach to the upper cervical spine is not a new procedure.[2] Since the early days of medicine before the era of antibiotic therapy, posterior or retropharyngeal abscesses have been successfully drained without secondary infection or sinus formation. Scoville and Sherman[3] reported its use for the removal of the odontoid process in basilar impression; Southwick and Robinson[4] and Mosberg and Lippman[5] described the transoral treatment of lesions of the second cervical vertebra; Fang and Ong[2] reported six cases of transoral reduction and fusion of atlantoaxial dislocation.

Summary

The indications for an anterior approach are lesions located predominantly in the body of the vertebra or intervertebral disks. Among these are spondylolisthesis, tuberculosis of the spine, prolapsed intervertebral disks, neoplasms, spinal biopsies, correction of fixed spinal curves, fractures, and fracture dislocations of the spine.

Despite many indications, this approach is rarely used, primarily because of unfamiliarity with the surgical field, instrumentation, and oral microbiota. Use of appropriate disciplines and consultations enabled this patient to receive comprehensive treatment from a community of health care specialists.

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