Surgical Treatment of Sacral and Presacral Tumors Other Than Sacrococcygeal Chordoma*

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The benefits which accrue from the combined efforts of neurosurgeon, general surgeon and orthopedic surgeon in the management of sacrococcygeal chordoma have been detailed in earlier communications. Although chordoma is the most prevalent sacrococcygeal neoplasm, especially in the congenital group of tumors, it is far from being the only lesion to violate this region. The infrequent occurrence of any presacral tumor—Whittaker and Pemberton reported a rate of only 1 in 40,000 cases—must make any individual surgeon’s experience with more than two or three varieties of this tumor unique. With this in mind, it seemed reasonable to review the assortment of sacral and presacral tumors that might be encountered in dealing with lesions in this region, and to illustrate the technic and results of the combined attack on tumors which are seen even less commonly than chordoma.

Embryology

Laird has presented an orderly review of the embryologic changes occurring in the caudal end of the embryo during the 3rd to the 8th week of development. Study of these changes certainly implicates this portion of the embryo as the site of origin for the assorted neoplasia that may eventually involve the presacral area.

Within a few weeks, the connection from the neural groove, the neurreneric canal, becomes obliterated. The postanal gut, that is the portion of the hindgut caudal to the proctodeum, obliterates as the anus and rectum form; and the notochord, having become segmented, leaves vestiges of the neural canal at its distal tip. The presumption, then, is that any of these pluripotential cells left behind as “rests” in the developing embryo are capable of later multiplication with resultant neoplastic capabilities. According to Ewing, the embryonal structures giving rise to presacral tumors are the fovea coccygea and coccygeal vestiges of the neural canal, the neurenteric canal, the postanal gut, and the proctodeal membrane. Of course, other tumors are encountered in the presacral space which are not fundamentally congenital in origin, and this, then, necessitates that they be classified.

Classification

Although somewhat uncommon, these lesions can no longer be considered rare when it is realized that in 1953 Mayo et al. presented a study of the differential diagnosis of 161 presacral tumors previously treated at the Mayo Clinic. Treatment of such lesions was then, as it is now, a difficult problem. Consequently, in a search for some unanimity of opinion regarding a standardized form of surgical treatment, opinions naturally were sought of those surgeons of the separate specialties that deal with lesions of this type. It was felt that utilization of the particular talents of each specialist in a logical sequence might be conducive to a better end result than had been possible previously. Therefore, at the Mayo Clinic, since 1949 each patient having sacral and presacral tumors other than a sacrococcygeal chordoma has been seen and evaluated by each surgeon whose special technics are to be utilized in treating these tumors. From 1949 through 1961, 52 patients with such tumors were seen.
at this clinic and were operated on by the combined method. Rowe and Brock revealed a grouping which has been adapted to this series. Their grouping and the distribution of tumors among the 52 patients were as follows: congenital 21, neurogenic 12, osseous 2, fibrogenic 1, myogenic 0, inflammatory 2, and miscellaneous 14.

**Symptoms**

Frequently there are no complaints referable to these lesions. However, symptoms may vary. With some patients manifesting more than one complaint, the frequency of individual symptoms was as follows: rectal pain or fullness in 3, perineal hysthesia or paresthesia in 6, low-back pain in 8, sacral pain in 2, pain in the buttocks or lower extremities in 7, urinary incontinence in 2, and miscellaneous complaints ranging from abdominal pain to history of uterine dystocia. Constipation in the adult was a less frequent complaint than anticipated and the 5 patients referred to this clinic specifically for constipation were all less than 2 years of age. Perhaps the relative rectal displacement by tumor is greater in infants than in adults.

**Signs**

Sacral and presacral tumors are well-concealed lesions and classical signs may be sparse. Growing slowly in a functionally "silent" anatomic area, tumors may achieve sizable proportions without producing readily apparent abnormality. Their presence becomes overt, however, when they produce neurologic deficit by invasion or distortion of the sacral roots, or of the trunks of the sciatic or pudendal nerves. Motor dysfunction of the lower extremity may be manifest in the gluteal, hamstring, or gastrocnemius soleus groups with coincident atrophy and diminished Achilles reflex. Sensory impairment, especially about the anus or saddle area, is a frequent finding, and disturbances of the sphincter producing urinary incontinence or fecal soiling from a patulous anus are obvious. Aside from the palpable presacral mass, which at times may be felt even on abdominal examination, there are other less striking findings. These may consist of small café-au-lait spots in conjunction with scattered neurofibromas, venous engorgement of a buttock overlying a tumor, tender sciatic nerves, positive Lasègue's sign (sciatic stretch tests), draining perirectal sinuses, and palpable masses in the buttocks or overlying the lower part of the sacrum.

Therefore, careful inspection of the patient, always including digital rectal examination and precise neurologic survey, is mandatory. Eighteen patients had no complaints referable to the involved region, the lesion being detected on routine examination. Thorough neurologic examination is a preoperative and postoperative necessity. Not only is it useful in determining the possibility of neural invasion, but it aids the surgeon in predicting rate and extent of recovery. Thirteen patients had pre-existing neurologic deficit on the initial examination.

**Diagnostic Tests**

There are ancillary procedures which complement the examination of the patient suspected of harboring a presacral tumor. Routine roentgenograms of the lumbosacral portion of the spinal column and pelvis are a useful adjunct not only in determining the location and extent of the lesion but also in strengthening the preoperative diagnosis on a pathologic basis. Intraspinal lesions presenting ventrally will thin the sacrum leaving its margin well defined; tumors of the sacrococcygeal bony structures will expand the sacrum by proliferation; teratomas present ragged erosion of adjacent bone and may be identified by the presence, at times, of calcification or ossification within their boundaries. Sixteen patients had evidence of tumors on routine roentgenograms of this region. But roentgenographic visualization frequently is hampered by overlying gas or feces, and preparation of the bowel and most careful examination of the roentgenograms are necessary.

Direct proctoscopic visualization of these extrarectal masses as they impinge on the