Dysesthetic Pain in Patients with Syringomyelia


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Abstract

Dysesthetic pain is a common complaint of patients with syringomyelia, traumatic paraplegia, and various myelopathic conditions. Because cavity lesions of the spinal cord can be defined with good resolution by magnetic resonance imaging, syringomyelia provides a potential model for examining anatomic correlates of central pain. In this study, a syndrome of segmental dysesthesias, characterized by burning pain, hyperesthesia, and a variable incidence of trophic changes, was described by 51 of 137 patients (37%) with syringomyelia at the time of clinical presentation. Complete magnetic resonance scans, including axial images, demonstrated extension of the syrinx into the dorsolateral quadrant of the spinal cord on the same side and at the level of pain in 43 of 51 patients (84%). Surgical treatment of syringomyelia resulted in the relief or improvement of dysesthetic pain in 22 of 37 patients (59%), but 15 patients (41%) reported no improvement or an intensification of pain despite collapse of the syrinx. Postoperative dysesthetic pain was often a disabling complaint that responded poorly to medical therapy, including anesthetics, sedatives, antiepileptics, antispasmodics, and anti-inflammatory agents. In most cases, there was a gradual improvement of symptoms, although six patients continued to complain of pain 24 to 74 months postoperatively. Prompt but transient relief was achieved in two of these patients with regional sympathetic blocks, and prolonged relief was achieved in one patient by stellate ganglionectomy. We conclude that painful dysesthesias can be caused by a disturbance of pain-modulating centers in the dorsolateral quadrant of the spinal cord and have certain causalgia-like features that respond in an unpredictable way to surgical collapse of the syrinx.

Painful dysesthesias, which have been described variously as burning pain, pins and needles sensations, and stretching or pressure of the skin, occur in ~40% of patients with syringomyelia (20, 24, 43, 44). The pain tends to arise in a dermatomal pattern and is accompanied, in most cases, by hyperesthesia. Although the pathophysiology of dysesthetic pain is poorly understood, it seems to be related to a de differentiation of nociceptive and/or lemniscal pathways within the spinal cord (3, 37, 40). A similar type of pain occurs in patients with spinal cord injury (6, 8, 14, 27, 41) and has been reported in association with other myelopathic conditions, including intramedullary tumors (12, 25) and multiple sclerosis (33, 36).

In this study, the incidence and clinical features of dysesthetic pain were reviewed retrospectively in 137 patients with various types of syringomyelia. Anatomic correlates of pain were established by magnetic resonance imaging (MRI) before and after surgical treatment. Evidence is presented that dysesthetic pain is associated with cavity lesions in the dorsolateral quadrant of the spinal cord and responds in an unpredictable way to surgical collapse of the syrinx.

MATERIALS AND METHODS

One hundred and thirty-seven patients with various types of nonneoplastic syringomyelia were evaluated by MRI between 1987 and 1994. At the time of clinical presentation, 29 patients (21%) were pain-free and 108 (79%) complained of one or more of the following symptoms: segmental dysesthesias, radicular pain, headache, suboccipital or neck pain, back pain, and trigeminal pain. The incidence of pain in 137 patients with syringomyelia is given in Table 1.
<table>
<thead>
<tr>
<th>Pain</th>
<th>No. of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pain</td>
<td>29</td>
</tr>
<tr>
<td>Segmental dysesthesias</td>
<td>51</td>
</tr>
<tr>
<td>Burning pain</td>
<td>43</td>
</tr>
<tr>
<td>Hyperesthesia</td>
<td>41</td>
</tr>
<tr>
<td>Pins and needles</td>
<td>37</td>
</tr>
<tr>
<td>Stretching or pressure of skin</td>
<td>17</td>
</tr>
<tr>
<td>Trophic changes</td>
<td>15</td>
</tr>
<tr>
<td>Hyperhidrosis</td>
<td>8</td>
</tr>
<tr>
<td>Glossy skin</td>
<td>5</td>
</tr>
<tr>
<td>Coldness</td>
<td>12</td>
</tr>
<tr>
<td>Pale extremity</td>
<td>3</td>
</tr>
<tr>
<td>Radicular pain</td>
<td>36</td>
</tr>
<tr>
<td>Headache</td>
<td>25</td>
</tr>
<tr>
<td>Suboccipital or neck pain</td>
<td>67</td>
</tr>
<tr>
<td>Back pain</td>
<td>17</td>
</tr>
<tr>
<td>Trigeminal pain</td>
<td>9</td>
</tr>
</tbody>
</table>

**TABLE 1. Incidence of Pain in 137 Patients with Syringomyelia**

A total of 51 patients complained of painful dysesthesias. There were 39 female and 12 male patients who ranged in age from 15 to 67 years (mean age, 41.7 yr). Causative factors associated with syringomyelia included the Chiari I malformation (27 patients), trauma (15 patients), cervical disc disease/spondylosis (5 patients), basilar impression (3 patients), and communicating hydrocephalus (1 patient).

Dysesthetic pain was described as an intensely disturbing phenomenon that was characterized by a variety of sensations, including burning, pricking, stretching, and pressure of the skin (see Table 1). Hyperesthesia was typically present within affected dermatomes and was often an agonizing symptom brought on by the touch of clothing, movement of an extremity, or vibrations leading to an inability to work, sleep, or enjoy peace of mind free from anxiety. Trophic skin changes were present in 15 patients and included one or more of the following findings: hyperhidrosis, coldness, glossiness; and paleness of the skin. In 42 of 51 patients, the dermatomal pattern of pain overlapped with a segment of analgesia/anaesthesia.

**Preoperative evaluation**

Each of the patients in this study underwent a detailed neurological examination and MRI of the spinal cord, with axial and longitudinal images that included the area of cavitation and the cervicothoracic junction. Standard technique called for consecutive 4-mm axial and longitudinal sections through the area of cavitation. Additional information was obtained for some patients by performing MRI of the brain, gadolinium-enhanced MRI of the spinal cord, radiography of the spine, computed tomography of the head or spine, water-soluble contrast myelography, delayed computed tomographic myelography, electromyography, somatosensory evoked potential studies, and nerve conduction studies.

**Operative treatment**

Thirty-seven patients with dysesthetic pain underwent surgical treatment for syringomyelia. For each of 16 patients with the Chiari I malformation, treatment consisted of a suboccipital craniectomy and upper cervical laminectomy sufficient to decompress the cerebellar tonsils. For each patient in whom the diameter of the syrinx was >50% of the spinal cord diameter (12 patients), posterior fossa decompression was combined with a syringoependymal (SC) shunt from the rostral end of the cavity to the cerebellomedullary cisterna, according to a previously described technique (31, 32). Additional steps, such as lysis of adhesions and duraplasty, were not performed. In three patients, previously implanted shunts to the pleural space or spinal subarachnoid space were removed at the time of surgery.

Posttraumatic syrinxes were treated in 12 patients by implanting shunts in the spinal subarachnoid space or cisterna magna. Five patients with cervical disc disease/spondylosis and syringomyelia underwent anterior discectomy and fusion, and two patients subsequently required SC shunts. Syringomyelia occurring with basilar impression was treated by resection of the odontoid process in one patient and by SC shunts in two patients. A ventriculoperitoneal shunt was placed in one patient with hydrocephalus and communicating syringomyelia.
Postoperative evaluation

Neurological examinations were performed on a daily basis during the patient's hospitalization and at [almost equal to]10 weeks, 4 months, and every 8 to 12 months thereafter. In most cases, MRI scans were obtained in the immediate postoperative period and on a semianual or annual basis.

RESULTS

MRI correlates

The MRI correlates of dysesthetic pain are given in Table 2. An analysis of axial plane images demonstrated a cavity lesion in the dorsolateral quadrant of the spinal cord ipsilateral to and at the segmental level of pain in 43 of 51 patients (84%). In 24 of 27 patients with the Chiari I malformation, there was dorsolateral expansion of the central syrinx at one or more levels, consistent with the dermalomal pattern of pain (Fig. 1). A similar pattern of cavity was present in 2 of 5 patients with cervical disc herniation/spondylosis and 2 of 3 patients with basilar impression. Predominantly eccentric cavities involving the dorsolateral quadrant of the spinal cord were present on the same side and at the level of pain in 15 of 15 patients with posttraumatic syringomyelia. Predominantly central cavities that were otherwise unremarkable at the level of pain were present in eight patients.

<table>
<thead>
<tr>
<th>Case</th>
<th>No. of Patients</th>
<th>Cavity at Level of Pain</th>
<th>Location of Cavity (at Level of Pain)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiari I</td>
<td>27</td>
<td>Central with paracentral extension (24)</td>
<td>Dorsolateral quadrant (24), central (24)</td>
</tr>
<tr>
<td>Basilar impression</td>
<td>3</td>
<td>Central with paracentral extension (2)</td>
<td>Dorsolateral quadrant (2), central (2)</td>
</tr>
<tr>
<td>Communicating hydrocephalus</td>
<td>5</td>
<td>Central (1)</td>
<td>Central (1)</td>
</tr>
</tbody>
</table>

**TABLE 2. Axial Plane Magnetic Resonance Imaging of Dyesthetic Pain (51 Patients)**

![MRI Image]

FIGURE 1. Magnetic resonance images of the spinal cord of a 30-year-old man with weakness of the right arm and dysesthetic pain involving the C5-C7 and T7-T9 dermatomes on the right. Upper left, sagittal image showing a Chiari I malformation and syringomyelia. The syrinx extended from C2 to T8 and appeared as a symmetrically enlarged central cavity (upper right) except at C5-C6 (lower left) and at T7 (lower right), where it expanded paracentrally into the right dorsolateral quadrant of the spinal cord.

Operative results
Table 3 summarizes the operative results in 37 patients with dysesthetic pain. Complications included urinary tract infection (two patients) and pneumonia (one patient), which were managed uneventfully. One patient developed a wound seroma after receiving an SC shunt and underwent a subsequent operation to repair a cerebrospinal fluid leak through the dural incision. Preoperative neurological deficits resolved in 9 patients, were significantly improved in 17 patients, and were slightly improved or unchanged in 11 patients. New deficits attributable to surgery did not occur. MRI demonstrated collapse or disappearance of the syrinx in 32 patients and a slight reduction in syrinx size in 5 patients over a follow-up interval of 6 to 74 months (mean, 34.2 mo). Surgical treatment resulted in the relief or significant improvement of dysesthetic pain in 22 of 37 patients (59%). Fifteen patients (41%) reported no improvement or an intensification of pain, despite collapse or disappearance of the syrinx, as demonstrated by MRI.

<table>
<thead>
<tr>
<th>Complications</th>
<th>No. of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary tract infection</td>
<td>2</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1</td>
</tr>
<tr>
<td>Cerebrospinal fluid leak</td>
<td>1</td>
</tr>
<tr>
<td>Neurological deficits</td>
<td></td>
</tr>
<tr>
<td>Completely resolved</td>
<td>9</td>
</tr>
<tr>
<td>Significantly improved</td>
<td>17</td>
</tr>
<tr>
<td>Slightly improved</td>
<td>9</td>
</tr>
<tr>
<td>Not improved</td>
<td>2</td>
</tr>
<tr>
<td>Magnetic resonance imaging of syrinx</td>
<td></td>
</tr>
<tr>
<td>Resolved (not visualized)</td>
<td>7</td>
</tr>
<tr>
<td>Markedly collapsed</td>
<td>25</td>
</tr>
<tr>
<td>Slightly collapsed</td>
<td>5</td>
</tr>
<tr>
<td>Dysesthetic pain 6 weeks postoperatively</td>
<td></td>
</tr>
<tr>
<td>Relieved</td>
<td>7</td>
</tr>
<tr>
<td>Improved</td>
<td>15</td>
</tr>
<tr>
<td>Not improved or intensified</td>
<td>15</td>
</tr>
</tbody>
</table>

**TABLE 3. Operative Results in 37 Patients with Dysesthetic Pain**

Postoperative dysesthetic pain

Table 4 summarizes experience with postoperative dysesthetic pain in 15 patients. No correlations were found with respect to causative factors, operative approaches, or the rapidity of syrinx collapse in this group, as compared with the group with pain relief. Postoperative dysesthetic pain was often a disabling complaint that responded poorly to conventional analgesics, including codeine. No apparent benefits were reported after the administration of Dilantin (9 patients), Tegretol (6 patients), Benadryl (5 patients), Valium (8 patients), Nembrulin (7 patients), Seconal (7 patients), Morin (8 patients), Naprosyn (2 patients), Clinoril (2 patients), and bactofer (5 patients).

<table>
<thead>
<tr>
<th>Response to medical therapy</th>
<th>No. of Patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous lessening of pain</td>
<td></td>
</tr>
<tr>
<td>3 months</td>
<td>3 of 15 (20)</td>
</tr>
<tr>
<td>6 months</td>
<td>7 of 15 (47)</td>
</tr>
<tr>
<td>12 months</td>
<td>9 of 12 (75)</td>
</tr>
<tr>
<td>Persistent complaints at 12 months</td>
<td>12 of 12 (100)</td>
</tr>
<tr>
<td>Response to sympathetic blocks</td>
<td>2 of 2 (100)</td>
</tr>
<tr>
<td>Response to sympathectomy</td>
<td>1 of 1 (100)</td>
</tr>
<tr>
<td>Persistent complaints after 24 months</td>
<td>6 of 7 (86)</td>
</tr>
</tbody>
</table>

**TABLE 4. Postoperative Dysesthetic Pain (15 Patients)**

There was a gradual improvement of dysesthetic pain in most patients. At 1-year follow-up, 9 of 12 patients (75%) reported a spontaneous lessening of pain but all continued to complain of unpleasant symptoms. Because of the causalgialike features of the pain, two patients underwent regional sympathetic blocks.
The first patient was a 43-year-old woman with posttraumatic syringomyelia, who had experienced continuous and intractable pain for 16 months after receiving an SC shunt. There had been a complete resolution of preoperative neurological deficits, including weakness of the left arm and leg and impaired sensation to light touch and pin prick from C5 to T4 on the left. Preoperative pain was greatly intensified after surgery and consisted of burning dysesthesias, hyperesthesia, hyperhidrosis, and coldness of the skin in a caped distribution over the left shoulder, arm, and breast. MRI demonstrated nonvisualization of the syrinx (Fig. 2). Medical therapy provided little or no relief, and the intensity of the pain led to weight loss, insomnia, and an inability to work. Prompt but transient relief was achieved by blocking the left stellate ganglion with 10 ml of 0.25% bupivacaine. A left stellate ganglionectomy was subsequently performed, providing complete relief of dysesthetic pain over a follow-up interval of 5 months.

![Magnetic resonance images of the spinal cord with dysesthetic pain](image)

**FIGURE 2.** Magnetic resonance images of the spinal cord of a 43-year-old woman with posttraumatic syringomyelia and dysesthetic pain involving the C5-T4 dermatomes on the left. Preoperative findings consisted of weakness of the left arm and leg and sensory loss involving the C5-T4 dermatomes on the left. Upper left and right, preoperative scan demonstrates an eccentric cavity that occupies the left dorsolateral quadrant of the spinal cord from C4-C7. Lower left and right, postoperative scan at 16 months shows a well-positioned SC shunt (arrows) and no evidence of a syrinx. The patient complained of postoperative dysesthetic pain that was greatly intensified after surgery, despite resolution of neurological deficits.

The second patient was a 48-year-old man with traumatic paraplegia, who complained of dysesthetic pain involving the T1-T4 dermatomes on the left that was greatly intensified after arachnoid lysis and an SC shunt for a C7-T10 syrinx. Prompt but transient relief was achieved by blocking the left stellate ganglion.

**DISCUSSION**

Few neurological conditions have a more complex and varied symptomatology than does syringomyelia. Included among the factors that can influence clinical findings are the causes of cavitation, the pathology of cavitation, the presence of associated lesions, such as hindbrain malformations, basilar impression, cervical disc disease, and hydrocephalus, and the development of secondary skeletal deformities, including scoliosis, kyphosis, and Charcot's joint. Pain is a complaint in 50 to 90% of patients (2, 11, 13, 15, 20, 24, 35, 39, 43, 44).
Burning pain and dysesthesias are reported to occur in 40% of patients with syringomyelia (20, 24, 43, 44). The complaint is especially common in patients with posttraumatic syringomyelia (24) and is accompanied, in many cases, by hyperesthesia, hyperalgesia, and trophic skin changes. In contrast to other types of pain that usually respond well to the surgical treatment of syringomyelia (2, 11, 16, 39), dyesthetic pain can persist (11, 35) or even increase postoperatively (34), despite collapse of the syrinx. The development of new dyesthetic pain that had not been present preoperatively has been noted by some authors (11, 42) and is extremely difficult to treat (42).

In this study, a syndrome of segmental dysesthesias, characterized by burning pain, hyperesthesia, and a variable incidence of trophic changes, was present in 33% of 137 patients (27%) with syringomyelia. The syndrome was distinguished from other types of pain that are common in this condition. The symptoms of dyesthetic pain were similar to those occurring in patients with traumatic paraplegia (6, 8, 14, 27, 41) and bore some resemblance to causalgia of peripheral origin. A distinctive feature of the syndrome was its tendency to dominate all other symptoms and become the primary reason for which most patients sought surgical treatment.

The anatomic correlates of dyesthetic pain were examined by MRI. Because axial images permit good resolution of the cross-sectional morphology of syrinx cavities, they can be used to correlate cavity patterns with neurological findings (30). In this study, axial plane MRI demonstrated a cavitory lesion in the dorsolateral quadrant of the spinal cord on the same side and at the level of pain in 43 of 51 patients (84%). This location is a preferred site for the paracentral extension of central canal syrinxes (29, 30) and is the quadrant of origin for most traumatic cavitations (29).

The observation that dyesthetic pain can be associated with lesions in the dorsolateral quadrant of the spinal cord provides a structural basis for examining central pain mechanisms. According to the "gate theory" of pain control (28), the activity of the nociceptive pathway is modulated by inhibitory influences from large, myelinated A fibers that enter the spinal cord from the medial division of the dorsal root and ascend for a varying distance in the posterior columns. Some control is apparently vested in the short collaterals of A-beta fibers that enter the substantia gelatinosa (Lamina II and III) of the dorsal horn (4, 5, 17, 18) and stimulate the release of met-enkephalin, a pain down-regulating peptide (10, 19, 38, 45). When primary afferents of the lemniscal system are injured, the loss of inhibitory control over the nociceptive pathway is thought to result in excessive firing of dorsal horn neurons, including the wide dynamic range neurons in Lamina V, leading to deafferentation hyperactivity (9, 37, 40).

There is abundant evidence that neuropathic pain of peripheral origin and ischemic pain associated with peripheral vascular disease can be influenced favorably under certain circumstances by dorsal column stimulation (1, 7, 26). Low-amplitude stimulation inhibits tonic sympathetic activity and produces an increase in blood flow in the cutaneous and muscular microcirculatory beds (21-23). The vasodilatory effect of dorsal column stimulation seems to be mediated by an inhibitory effect on peripheral vasoconstriction maintained by efferent sympathetic activity involving nicotinic transmission in the ganglia and postganglionic alpha-adrenoceptors (23). The spinal mechanism by which dorsal column stimulation inhibits tonic sympathetic activity remains unknown.

As demonstrated by axial plane MRI, many of the syrinxes in the current report encompassed an area that included both the dorsal horn and the posterior columns. Lesions in this location are consistent with current hypotheses of deafferentation pain (9, 37, 40) and with evidence that dorsal column stimulation is sometimes effective in the management of this condition (1, 7, 26). Recent pathological studies have shown that parenchymal cavitations, including the paracentral dissections of central canal syrinxes, are accompanied by gray matter necrosis and Wallerian degeneration (29). Taken together, these findings support the hypothesis of deafferentation hyperactivity and suggest that dyesthetic pain of central origin could be, in some cases, by a disturbance of pain-modulating centers in the dorsolateral quadrant of the spinal cord.

The results of surgical treatment for dyesthetic pain were disappointing. Despite effective decompression of syrinxes, there was either no improvement or an intensification of pain in 15 of 37 patients (41%), which is consistent with the results reported by others (11, 34, 35, 42). Persistence of dyesthetic pain or the development of new pain that was not present preoperatively has been attributed variably to injury of the dorsal root fibers or posterior columns during myelotomy (42), chronic irritation of these structures by shunt catheters (42), or sudden collapse of the spinal cord after drainage of the syrinx (34). In this study, no correlations could be found with respect to operative approaches or the rapidity of syrinx collapse in patients with postoperative dyesthetic pain, as compared with the group with pain relief.

The difficulty of treating postoperative dyesthetic pain has been previously noted (11, 35, 42). Conventional medical treatment, including analgesics, sedatives, antiepileptics, antispasmodics, and anti-inflammatory agents, was of limited benefit in the management of 15 patients in the current study, and similar results have been reported in patients who experience dyesthetic pain after the removal of intramedullary tumors (12, 25). In most cases, there was a spontaneous lessening of postoperative pain, although symptoms tended to persist, as they have in other series (12, 25, 35).

Regional sympathetic blocks were performed in two patients with intractable postoperative pain. The treatment was suggested by the causalgia-like features of the pain and its failure to respond to medical therapy. Although both patients reported an immediate relief of symptoms and prolonged relief was achieved in one patient by stellate
ganglionectomy, experience is too limited to arrive at any conclusions. It is appropriate to point out that obvious trophic changes were present in only 15 of 51 patients (29%), although quantitative testing of skin temperature and sweating was not performed. More work will be required before the incidence and significance of tonic sympathetic activity in these patients is known. The possibility that sympathetists might have a place in the management of dysesthetic pain deserves further consideration.

ACKNOWLEDGMENTS

We are indebted to J. Greteinstein, L. Backenroth, and S. Murray for excellent technical assistance. Some of the patients in this study were referred by the American Syringomyelia Alliance Project, Inc. The work was supported by the Edith Herrick Milhorat and Harry Arthur Kaplan Neurosurgery Research Funds of the International Neuroscience Foundation.

REFERENCES


COMMENTS

The authors provide a careful review of the frustrating problem of dysesthetic pain related to syringomyelia and to other forms of spinal cord injury. Successful relief of the syrinx, even when associated with gratifying improvement in neurological function, does not always improve pain. In my experience, when any residuals of the syrinx are left unresolved, the most likely to be residual is pain. Treatment is frustratingly difficult. Drugs known to be effective in neuropathic pain, such as carbamazepine, amitriptyline, and clonazepam, are frequently helpful. Narcotics are not useful and should be avoided. Spinal cord stimulation is occasionally effective. Some patients have required thalamic surgery. I agree that sympathectomy is occasionally useful. The numbers here are too small to make any judgment about the effectiveness of surgical sympathectomy in this condition. My own experience is similar. A small number of patients have been evaluated, but many have not; thus, I cannot determine whether the effect of the sympathectomy is specific or nonspecific. It is important that neurosurgeons realize the frequency of this dysesthetic pain and take the appropriate steps to relieve these unfortunate patients. Sympathectomy might not be effective for all patients, but a few patients, identified by appropriate response to sympathetic blocks, might benefit when the innovative drug therapies fail.

Donlin M. Long

Baltimore, Maryland

The article by Milhorat et al. is a landmark article, providing good evidence for a clinical-anatomic correlation between the terribly troubling dysesthetic pain of syringomyelia and involvement of the posterior columns by the destructive syrinx cavity. The precise pathways involved in this form of "central" pain have always been a matter of speculation. Involvement of the intermediate division of the posterior column has been a favored theory. Milhorat et al. provide evidence for the gross anatomic correlate. Appropriately, they are concerned about the increase of dysesthetic pain that persists in some patients, despite magnetic resonance imaging (MRI) evidence of syrinx cavity collapse. The possibility of progressive gliosis, which might penetrate into the cord surrounding the collapsed cyst, has been proposed as a possible explanation. The treatment modalities discussed, although not established, are provocative and interesting. Some patients are said to obtain relief of this type of pain with dexamethasone, a commercially available cannabinoid, and work is being performed to develop other drugs directed at central pain.

Ulrich Betsdorf

Los Angeles, California

The authors report their experience concerning dysesthetic pain in a large series of patients with syringomyelia (137 patients). Among these patients, one-third (51 patients) had painful dysesthesia, demonstrating the importance of this complaint in patients with syringomyelia.

An original and interesting point investigated by the authors is the possible correlation between the position of the syrinx cavity, as revealed by axial MRI, and the presence of dysesthetic pain. An extension of the syrinx into the dorsolateral quadrant of the spinal cord on the same side as the pain was found in 84% of the cases (43 patients). Unfortunately, the MRI findings of the remaining 86 patients with syringomyelia but without dysesthetic pain were not described. The incidence of extension of the syrinx into the dorsolateral aspect of the spinal cord is unknown for these patients. The thesis might have been supported by a separate reading by a neuroradiologist, who was unaware of the symptomatic lesion of all the MRI studies of the 137 patients, assessing specifically the extension of the cavity.

According to this "blind" evaluation, it would then have been interesting to determine whether the syrinx topology, as revealed by MRI, is really a predictive factor for dysesthetic pain. Of note in this regard is the work of Hida et al. (4), who described that the topography of the syrinx cavity in posttraumatic patients was different at the rostral end compared with the caudal end, the latter being more central than the former.

Thirty-seven patients with dysesthetic pain underwent operations appropriate to the primary cause of the syrinx (suboccipital craniectomy or various shunting). Despite the excellent anatomic results, with a collapse of the syrinx...
demonstrated by MRI in most of the patients (32 patients), the pain was unimproved in 41% (15 patients). No correlation between the absence of pain relief and other factors (e.g., causative factors) was found. Unfortunately, these patients were also resistant to all drug therapies that were tried for their pain. Multiple drugs, including baclofen, amitriptyline, and carbamazepine, have been proposed with some reported success (3, 7). Our clinical experience is in accord with the findings of Milhorat et al. in that no drug predictably provides a sustained significant relief of the dysesthetic pain.

A shortcoming of the article, which makes it somewhat difficult to interpret the results, is that no quantitative evaluation of the pain before or after surgery is reported. As pointed out by many authors, the pain evaluation remains a very critical issue when dealing with any chronic pain, such as the dysesthetic pain often associated with syringomyelia (2, 5). A basic evaluation, such as the Visual Assessment Scale or the McGill Pain Inventory, would have been valuable in pain assessment (1, 6).

In conclusion, this article presents a large series of patients with syringomyelia and dysesthetic pain. The data support the concept that such dysesthetic pain is very difficult to treat and frequently resists successful anatomic treatment of the cavity. The authors also suggest an interesting relationship between the presence of an extension of the syringomyelia cavity into the dorsolateral aspect of the spinal cord and the development of painful dysesthesias. Finally, the authors point out that in many cases; the dysesthetic pain is intractable to any known medication or surgical treatment.

Jacques Favre
Kim J. Burchiel
Portland, Oregon

Key words: Causalgia; Chiari I malformation; Dysesthetic pain; Neuropeptides; Spinal cord; Syringomyelia