Original Article

Neuropathic Pain Referrals to a Multidisciplinary Pediatric Cancer Pain Service

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Abstract:

Neuropathic pain (NP) in children with cancer is not well characterized. In a retrospective review of patient data from a 3.5-year period, we describe the prevalence of NP and the characteristics, duration of follow-up, and interventions provided for NP among patients referred to a pediatric oncology center's pain management service. Fifteen percent (66/439) of all referrals to our pain service were for NP (56/323 patients [17%]; 34 male, 22 female). The NP patient group had 1,401 clinical visits (778 inpatient visits [55.5%] and 623 outpatient visits [44.5%]). Patients with NP had a significantly greater mean number of pain visits per consultation ($p = .008$) and significantly more days of pain service follow-up ($p < .001$) than did other patients. The most common cause of NP was cancer treatment rather than the underlying malignancy. Pharmacologic management of NP was complex, often comprising three medications. Nonpharmacologic approaches were used for 57.6% of NP referrals. Neuropathic pain is less frequently encountered than non-NP in children with cancer; nevertheless, it is more difficult to treat, requiring longer follow-up, more clinical visits, complex pharmacologic management, and the frequent addition of nonpharmacologic interventions.

Neuropathic pain (NP) is pain directly caused by a lesion or disease affecting the somatosensory system (Treede et al., 2008). Neuropathic pain is encountered less often than nociceptive pain and is more difficult to treat (Berger et al., 2004; Grond et al., 1996; Walco et al., 2010). Neuropathic pain can impair quality of life by causing suffering and by reducing the patient's ability to function and perform normal activities of daily living (Hudson et al., 1998; Jensen & Finnerup, 2007; O'Connor, 2009).

Experience of pain early in life may permanently alter pain-related behavior and perception (Howard, 2003). Pediatric oncology patients can

experience NP through tumor invasion of the spinal cord or nerve roots (Collins et al., 1996), amputation (Krane & Heller, 1995; Melzack et al., 1997), limb-sparing surgery (Swarm et al., 2010), chemotherapy (Anghelescu et al., 2011), radiation therapy (Bleyer et al., 2009), or hematopoietic stem cell transplantation (Grond et al., 1996). Although children are known to experience NP, most of the available literature describes adults. Few systematic studies have been reported in pediatric patients. Attempts to compare pediatric and adult NP have suggested that substantial differences are to be expected in prevalence, symptoms, duration, recurrences, and response to different treatments; therefore, further research is necessary (Walco et al., 2010).

In the present paper, the characteristics of oncology patients referred to a pediatric cancer center pain management service and diagnosed with NP are described, along with the prevalence of NP among pain service referrals, the duration of follow-up, and the pharmacologic and nonpharmacologic interventions provided for NP management. This study tests the hypothesis that NP is less common than non-NP in pediatric cancer patients, requires longer follow-up, is more difficult to treat, and requires multimodal therapy that often comprises both multiple pharmacologic and nonpharmacologic approaches.

METHODS

This retrospective review was approved by the St. Jude Children's Research Hospital Institutional Review Board. A prospectively maintained pain service database captures all referred patients, each encounter with the pain service, patient characteristics (age, sex, oncologic diagnosis, and cause of pain), the specific pain diagnosis for each pain service visit (NP, nociceptive pain, mixed nociceptive and neuropathic pain), and pharmacologic and nonpharmacologic therapies.

The database was retrospectively analyzed to determine the total number of patient referrals to the pain service from January 2001 to June 2004, the number of pain service visits per patient and per referral, the treatment prescribed, and the duration of follow-up (inpatient and outpatient). The number of patient referrals was used to generate the incidence of NP versus non-NP in the patient population followed by the pain service; the number of pain service visits was used to calculate the number of visits per patient and per referral. A clinical visit was defined as any inpatient or outpatient encounter with the pain service physician and/or clinical nurse specialist. Some patients were treated for a pain event during the study period and then discharged. If these patients were subsequently referred to the pain service during the study period, they were counted as new referrals. The duration of pain service follow-up was defined as number of days between the initial consultation provided by the pain service and the last visit, when the patient was discharged from the pain service.

Patient referrals were categorized by type of pain (NP and non-NP). Any patient with an NP component, including those with mixed NP and nociceptive pain, was included in the NP category. The diagnosis of NP was established based on at least one of the following criteria: 1) presence of pain descriptors suggestive of NP, such as burning, tingling, shooting, "needles and pins"; 2) distribution of pain suggestive of irradiation along the anatomic distribution on a nerve; and 3) association with a clinical circumstance which is known to be a generator of neuropathic pain, such as administration of chemotherapy (vincristine), postoperative pain associated with mechanical nerve trauma (limb-sparing surgery) or with severing of nerves (amputation). Any one or more of these diagnostic criteria are taken into consideration when establishing the diagnosis of NP in children in our practice. In preverbal children, we had to rely mostly on the third criterion to diagnose NP. Additional diagnostic imaging data (i.e., mass compressing the spinal cord or nerve roots) is considered in support of establishing the diagnosis of NP in children who present with pain but can not report the characteristics or distribution of pain. The diagnosis of NP was reevaluated at each pain service visit and included in the documentation reflecting pain assessment for each visit.

Patient characteristics and pharmacologic and nonpharmacologic therapies were collected from the pain service database and the medical records. Data were collected with the use of a standardized case report form developed by the investigators and were analyzed with the use of descriptive statistics. We used the one-sample t test and the Wilcoxon signed rank test to compare the number of encounters per referral and the duration of follow-up for NP versus non-NP patients, respectively, on the pain service.

RESULTS

From January 2001 to June 2004, the pain service accepted 439 referrals of 323 patients. Fifty-six (17%) of these patients had NP (34 male and 22 female), and 66 referrals (15%) were for NP. The median age of patients with NP was 16 years (range 2.2–28.2 years), and the median age of non-NP patients was 13.9 years (range 0.3–37.5 years). Patients >20 years old represented 16% (9 of 56) and 13.2% (37 of 281) of the NP and non-NP groups, respectively. The majority of