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Original Contribution

Audit of postoperative pain management after open thoracotomy and the incidence of chronic postthoracotomy pain in more than 500 patients at a tertiary center

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ABSTRACT

Study objective: To evaluate the quality of postoperative pain relief during the first 3 days after surgery and to evaluate with the incidence of persistent pain at 6 months after surgery.
Design: Retrospective single-center audit.
Setting: University hospital.
Patients: Five hundred four patients who underwent thoracotomy.
Interventions: Review of patient records, questionnaire, and telephone review.
Results: Of the 364 survivors, 306 were contacted. Five or more episodes of severe pain (numerical rating scale >6/10 at rest or movement) during the first 72 hours after surgery occurred in 133 patients. Persistent postsurgical pain at 6 months was present in 82% (109/133) of these patients. Patient satisfaction with acute postoperative pain management was excellent (36%), good (43%), and fair or poor (21%).The incidence of postthoracotomy pain was 56% (mild 32%, moderate 18%, and severe 6%).
Conclusions: Poorly controlled acute postoperative pain correlated with persistent postsurgical pain at 6 months. In view of such a high incidence in thoracotomy patients, preventative strategies assume great significance.

1. Introduction

Persistent pain is a recognized complication after several surgical procedures. A recognized cause of persistent postsurgical pain is poorly controlled immediate postoperative pain. Open thoracotomy can induce significant pain during the immediate postoperative period. Patients undergoing thoracotomy also have one of the greatest incidences of chronic postoperative pain and disability among all the surgical procedures [1]. The International Association for the Study of Pain defines *chronic postthoracotomy pain* (CPTP) as pain that persists or recurs along a thoracotomy scar for more than 2 months after surgery [2]. The incidence of CPTP is approximately between 30%-60% [1-5]. The CPTP has features of neuropathic pain in more than 3 quarters of patients [6]. Chronic neuropathic pain is a complex condition that has a profound effect on both quality of life and health care expenditures [7]. In view of such a high incidence of CPTP in thoracotomy patients, preventative strategies assume great significance. This condition remains a challenge for clinicians as a variety of treatment and prevention strategies have yielded disappointing results [8-10]. We performed a retrospective evaluation of the quality of pain relief during the immediate postoperative period and present our audit of 504 patients in a tertiary center over a 2-year period postthoracotomy.

2. Methods

The audit was performed in 2 phases. A retrospective audit was performed on data collected on a cohort of adult patients who underwent thoracotomy over a 2-year (May 2010-April 2012) period at Glenfield Hospital, University Hospitals of Leicester. A telephonic survey was then conducted on the survivors with a complete pain assessment questionnaire. This joint departmental (Anaesthesia and Thoracic Surgery) audit

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was discussed and registered with Clinical Audit, Safety, and Effectiveness, University Hospitals of Leicester NHS Hospital Trust and performed over a 3-month period (November 2012-February 2013). Ethics approval was not required as it was a process audit and service evaluation.

The aim of the audit was to evaluate the quality of postoperative pain relief during the first 3 days after surgery and to quantify the incidence of persistent pain at 6 months after surgery in our cohort. We defined *poorly controlled postoperative pain* as having 5 or more episodes of severe pain (numerical rating scale >6/10 at rest or movement) during the first 72 hours after surgery.

Patients were identified from previously collected hospital data systems and the pain database. We reviewed pain database and the postoperative pain charts of the patients to obtain information about the frequency of analgesic failure, failure rate of epidural analgesia, and satisfaction scores reported by the patient on termination of epidural analgesia.

Patients were contacted by telephone and after obtaining verbal consent, the patients were asked to complete a questionnaire. The audit questionnaire was adapted from the study questionnaire used by Maguire et al [6]. The direct care clinical team was involved in telephone follow-up.

The questionnaire included questions on the presence of long standing pain before surgery, presence of episodes of severe pain during the first 72 hours after surgery, and satisfaction with postoperative pain management (Appendix 1).

We then compared the information from the pain charts with the information provided by the patient during the telephone review and evaluated how well patient recall matched the information on pain charts.

The standard technique for postoperative pain management is patient controlled thoracic epidural analgesia at our center and rescue analgesia is provided with patient controlled analgesia (PCA) with morphine. The epidural solution contained a mixture of bupivacaine 0.125% and fentanyl 2 mcg/mL with a set rate of 6-12 mL/h and a patient controlled bolus rate of 2 mL and lock-out period of 10 minutes. The PCA with morphine contained morphine solution 1 mg/mL, 1 mg per bolus, and lock-out period of 5 minutes. Adjuvant analgesia included regular acetaminophen 1 g, 6 hourly and as required 6 hourly tramadol 100 mg. Diclofenac 50 mg 8 hourly was prescribed in patients on PCA with morphine whereas it was avoided with patient controlled thoracic epidural analgesia.

3. Results

A total of 504 patients underwent open posterolateral thoracotomy during the audit period. There were 364 survivors and we were able to contact 306 patients (84%).

Epidural analgesia was provided in 95% patients (289/306). Epidural failure rate was 27% over the 72-hour period. Seventeen patients received PCA with morphine due to patient refusal for thoracic epidural analgesia.

During telephone review, it emerged that 5 or more episodes of severe pain (numerical rating scale >6/10 at rest or movement) during the first 72 hours after surgery occurred in 133 patients. Persistent postsurgical pain at 6 months was present in 82% of patients who reported 5 or more episodes of severe pain during the first 72 hours after surgery. The CPTP was mild in 48%, moderate in 24%, and severe in 10% in patients who reported 5 or more episodes of severe immediate postoperative pain.

Patient satisfaction with acute postoperative pain management was excellent (36.3%), good (43.8%), fair (15.8), and poor (3.9%). We compared the patient records with patient recall on telephone follow-up during the audit. Only a third of the patients (35%) were able to accurately recall the number of episodes of severe pain during the first 3 days after surgery. Most patients (45%) underreported the episodes of severe postoperative acute pain during telephone follow-up 6-24 months after surgery. However, patient satisfaction with postoperative pain management revealed concordance between patient recall and that recorded on patient notes. Three-fourths of the patients recalled similar outcome for patient satisfaction as that recorded on the patient record (pain chart).

The overall incidence of postthoracotomy pain at 6 months postsurgery in our population was 56%. The CPTP was mild in 32%, moderate in 18%, and severe in 6%. The persistent pain had features of neuropathic pain in 79% of patients with CPTP. Thirty-nine percent of the interviewed patients with CPTP reported that their pain limits their daily activities. The persistent pain improved with time in 75% (131/174) of patients.

The incidence of CPTP was similar in both males and females (56.9% vs 56.7%). We observed a higher incidence of CPTP in patients aged above 60 years. There were 29 patients with preexisting chronic pain and 90% (26/29) developed CPTP at 6 months. The CPTP was present in 66% of patients who underwent redo thoracotomy (12/18).

4. Discussion

Our retrospective audit reveals that three-fourths of patients undergoing open thoracotomy were satisfied with the acute postoperative pain management. However, more than a third of patients contacted reported 5 or more episodes of severe pain during the first 72 hours after surgery. The incidence of CPTP in this cohort was high (82%) when compared with the overall incidence of CPTP (56%). This confirms the importance of adequate pain control in the immediate postoperative period.

Our audit confirms that persistent pain at 6 months continues to be a significant problem in patients undergoing thoracotomy. The results are similar to a review conducted at City Hospital, Nottingham a decade ago [6]. The pain was moderately severe in a quarter of patients and significantly affected the quality of life in nearly 40%. In Wildgaard series, 66% of patients suffered from pain that impaired normal daily activity for at least 12 months after thoracotomy and 90% of affected patients required prescription medications for pain and anxiety whereas 30% received specialist treatments. [4]. The CPTP can result in some level of disruption in the employment status, including reduced working time, unemployment, or early retirement [11]. Neuropathic pain can be extremely resistant to treat and adverse effects from antineuropathic medications can significantly impair quality of life.

Risk factors that are specific for the development of CPTP have not been identified. Assumptions have been made from persistent pain caused by other surgical procedures. A third of the data on CPTP in the literature are from retrospective studies and among prospective studies, there are conflicting conclusions [4]. Female sex and age below 60 years are considered risk factors for persistence of postsurgical pain [1,5,12,13]. However, the Tromso study in more than 12,000 patients did not find female sex or age to be an important risk factor for developing persistent postsurgical pain that included patients with CPTP [14]. In our audit, female sex and age below 60 were not associated with an increased incidence of CPTP. Preoperative pain has been well documented as a risk factor after hernia [15], breast [12], and limb amputation surgery [16]. However, 3 studies did not find a correlation between preoperative pain and CPTP [13,17,18]. In our audit, patients with preoperative pain had an increased risk for developing CPTP.

Severe postoperative pain has been recognized as a significant risk factor. In our audit, 82% of patients who had above 5 episodes of severe pain during the first 3 days after surgery suffered from persistent pain at 6 months. The CPTP was moderately severe in 37% of patients in this cohort.

In view of such a high incidence in thoracotomy patients, preventative strategies assume great significance. This condition remains a challenge for clinicians as many treatment and prevention strategies have yielded disappointing results [8]. The reasons for the failure of preventative interventions may be multifactorial. Firstly, most preventative interventions have focused on the perioperative period. There is evidence that both nerve injury and ineffective perioperative analgesia are not the only factors responsible for the development of CPTP [19,20]. Secondly, individual susceptibility to develop persistent pain as a result of psychological factors has been ignored as a probable factor