

Transforming the Concept of “State of the Art” Into “Real Pain Relief” for Patients after Cardiac Surgery – A Combined Nursing-Anesthesia Initiative

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Abstract

Several publications have shown that adequate postsurgical pain control after cardiac surgery has been difficult to obtain. Hospital services have been admonished to develop appropriate organizations of care that will facilitate the use of existing expertise rather than focusing on the development of new analgesic drugs. In this article the authors discuss the multidisciplinary collaboration that enabled the creation and implementation, in a busy cardiac surgery service, of a structure that has forged significant improvement in the treatment of pain after cardiac surgery. This nurse-run program promotes the use of a “low-tech, highly personalized” approach to pain management where the daily clinical work is supported by the concept of the “Patient Pyramid of Care”.

Keywords: Acute post-surgical pain; Acute pain service; Cardiac surgery; Interdisciplinary collaboration

Introduction

Optimal pain management is defined as a balance between effective analgesic modalities, treatment of side effects and patient safety [1] and a major function of an Acute Pain Service (APS) is to ensure safe and effective delivery of postoperative analgesia [2]. Our data [3] as well as that of other studies [4,5], has shown that pain levels after cardiac surgery are high and deleterious to patient well-being [4-8]. Faced with this information the overriding question was “what, if anything, could be done to improve this outcome?” After consultation, the consensus was that the implementation of a streamlined, parsimonious structure, with integrated individualized patient care, had the potential to effectively impact on levels of postsurgical pain. This paper is a “process paper” which provides a model for successful interdisciplinary patient care. We used the processes of reflection, creation and implementation to 1) reflect on our problem, 2) to create a solution and 3) to implement care. This article recounts how a few individuals in a tertiary care setting, with a goal of interdisciplinary collaboration, were able to transform “state of the art” ideas and technology for the relief of acute postsurgical pain into real pain relief for patients using the Patient Pyramid of Care.

The chosen model of care

Careful consideration was given to the elements that would ensure adequate structure and functionality of a new APS. A review of the literature regarding the implementation of such services [1,9-11] revealed 5 items as indispensable elements of a new structure; these were: 1) a multidisciplinary team, 2) an established educational program, 3) the provision of tools for practice, 4) the integration of an ongoing research program, and 5) the ability to perform periodic audits of practice. The daily activities of the service required a sixth

element: well-informed personnel with a strong knowledge and skills base. With these requirements in mind the model that emerged as the most highly suited to fulfill the criteria was that of a pyramidal design (Figure 1). Choice of the pyramidal design also assured that new elements could be integrated as required as the service expanded and responded to changing medical and surgical obligations.

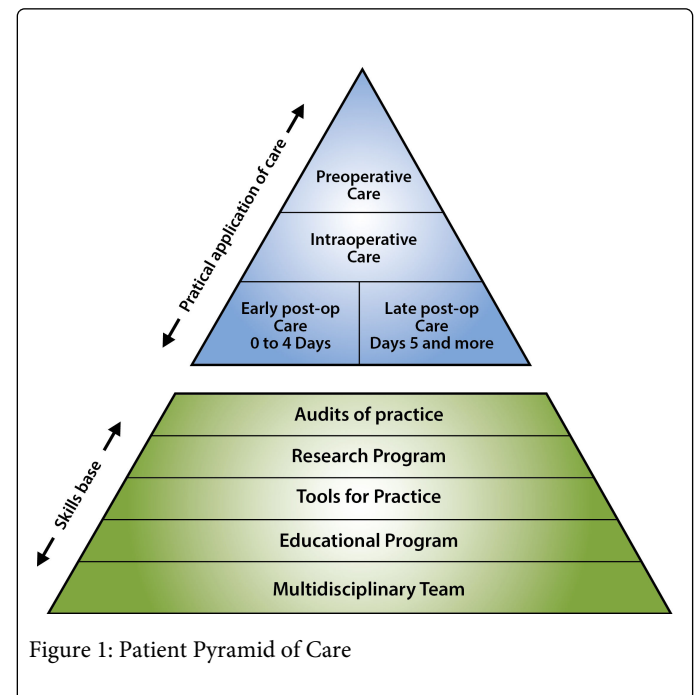


Figure 1: Patient Pyramid of Care

Elements of the base

Multidisciplinary team: As the initial vision of the working group for the creation of the APS was that of a cohesive, supportive, highly specialized, multidisciplinary environment for the care of our patients after surgery it was clear that the foundational elements of the pyramid were the hospital personnel. The multidisciplinary team in this APS includes members of the departments of anesthesiology, nursing, pharmacy, physiotherapy, psychology and cardiac surgery. Though the daily work is carried out largely by the members of the departments of nursing, anesthesiology and pharmacy all members contribute to the elaboration and revision of protocols when required.

Educational program: An educational program, supported by the department of nursing, existed prior to the implementation of the pain service but has become more structured and official since its inception. Elements of the new program include a course on the evaluation and treatment of postoperative pain for all currently employed nursing personnel; given 6 to 7 times a year. The topics covered in this course include: 1) screening for pain and the ABC's of evaluation of pain, 2) medications: their indications, uses and side effects, 3) appropriate patient surveillance, 4) trouble-shooting for the patient with uncontrolled pain. An additional ½ day course is given to all newly employed ICU nurses. It includes problem-based learning questions to discuss the evaluation and treatment of acute post-operative pain. Finally, all newly hired ICU nurses receive a 1.5-hour course on the surveillance, evaluation and treatment of pain. The overall time commitment to this program is 50+ hours per year.

Tool for practice: The tools for practice are of two types: visual aids and standardized protocols. The tools for practice include hand held documents and posters that cover the same material as that conveyed during the formal courses. This includes information on narcotics, their type, commonly used dosage, equivalencies, and adverse effects. A bookmark including the Numerical Pain Rating Scale, the Ramsay sedation scale and a memory aid for the “PQRST” mnemonic as well as a 4-page brief on the appropriate evaluation and management of pain was circulated to all medical personnel. Standardised postoperative pain management protocols have been implemented and revised several times. As new modalities of pain control have been integrated into hospital functioning additional protocols for the management of patient controlled analgesia (PCA) and regional analgesia, such as paravertebral blocks, have also been implemented.

Research program: A strong, institutionally supported, research program has included: 1) evaluation of patient attitudes and fears towards the use of narcotics [12]. 2) The evaluation of the efficacy of ketamine infusions during surgery and for the first 48 hours post-surgery for pain relief of post-operative pain [13]. 3) The evaluation of benefits of a patient educational handbook (study in progress).

Audit of practice: The establishment of a computerized database has allowed the acute pain service to evaluate the benefits accrued. Over the past 3 years we have evaluated over 5684 patients and have over 17347 pain scores and 19672 follow-up visits in the database. 2029 side effects have been reported, 681 complications and 5795 interventions have been performed.

With implementation of the APS decreasing levels of pain were noted reflecting the change between pre-APS [3] and 3 years after inception. The mean level of “average pain at rest”, for patients who have pain, is now 3.9 on Day 1 (from 4.0) and 2.9 on Day 4 (from 3.7). Mean levels of “average pain on movement” for patients with pain are now 4 on Day 1 2 (from 5.3) and 3.1 on Day 4 (from 4.6). The

proportion of pain free patients on Day 1 has increased from 27% to 50% and from 34% to 77% on Day 4.

A smaller long-term follow up of patients has shown that levels of chronic pain have also declined. Of a total of 489 patients, at an average of 10 months after surgery, 19.8% of men (68/343) and 25% of women (37/146) had pain in the last 24 hours. Pain scores with movement, using the NRS of 0 to 10, were mostly in the lower ranges with 6.7% of patients between 1 and 3, 4.7% of patients between 4 and 6 and only 2.2% of patients stated 7 or more.

Practical Application

The practical application portion of the pyramid involves the day-to-day running of the pain service. The service adopted a nurse-based, and anesthesiology supervised model.

Early postoperative pain control: The APS operates 24 hours a day, 7 days a week. Full nursing coverage is available 5 days a week, 8 hours a day; evening, night and weekend coverage is assured by the anesthesiologist on call. The service is protocol driven. The protocols are created and reviewed by all members of the team at regular intervals. Prior to circulation they are reviewed by a formal hospital regulating body. The general philosophy of the acute pain service is that of multimodal management and regular dosing. All patients are seen and evaluated every day, for the first 4 post-operative days. The APS nurse rounds on the patients in the early AM, trouble shoots any urgent problems and then a second set of rounds in mid-morning is done with the APS team where medications are readjusted as required.

Late postoperative pain control: Patients who do not attain pain scores less than 3/10 on the NRS by day 4 are followed for longer periods of time. If necessary patients will be seen on return visits or after they are transferred off service. As with early acute pain all patients are evaluated at rest and on movement, medications are adjusted and side effects evaluated.

Intraoperative pain management: The anesthesiologists of the department have reached a consensus and, in general, adhere to one of two intraoperative protocols that include either fentanyl or sufentanyl. Other medications included are low-dose ketamine, magnesium and lidocaine infusions.

Preoperative pain management: At the tip of the pyramid is the first element. All patients receive a pre-operative visit from the anesthesiologist the night before surgery and a pre-medication that includes morphine, scopolamine and possibly midazolam. Pre-medications are known to reduce anxiety and may thereby contribute to decreasing pain [14,15].

Discussion

Our hospital administration has supported a streamlined, “low-tech”, parsimonious structure that has yielded significant positive results in the management of pain after cardiac surgery, an area known for its persistent treatment difficulties [4,8]. Modern society often conveys the message that “state of the art” medical care must necessarily include the simultaneous utilization of many forms of highly specialized and complex apparatus. Yet, it is incumbent on the physician and nurse caring for patients to remember that the essence of the role of caring and healing involves not only a scientific expertise and sophistication but also a “compassionate engagement in the suffering of our fellow human beings [16]. Rawal [2] goes further and states that: “the solution to the problem of inadequate pain relief lies

not so much in the development new analgesic drugs or technologies but in the development of an appropriate organization to utilize existing expertise.” The authors of this article have shown that it is possible to affect change in a world where medical practice is dictated by socioeconomic influences. The acute pain service has now been running for 4 years and has evaluated and treated over 5800 patients. Pain control has improved significantly over the 4 years and both patient and personnel satisfaction has greatly improved.

Conclusion

Rawal has stated that “Improvement in perioperative analgesia is not only desirable for humanitarian reasons but is also essential for its potential reduction of postoperative morbidity and mortality” [2] and we concur with this entirely. All organizations wish to provide comfort for their patients and acute pain services are not a new idea, however, they are often an ideal that if established, are difficult to maintain for both personnel and economic reasons. We reported here on a “low tech” approach that provided us with quality results. We feel that our success in managing acute postoperative cardiac pain is directly related both to the structure of our APS service and the devotion and leadership of the nursing team. It combines both “low tech” and “personalized therapy”.

References

1. Goldstein DH, Ellis J, Brown R, Wilson R, Penning J, et al. (2004) Recommendations for improved acute pain services: Canadian collaborative acute pain initiative. *Pain Res Manag* 9: 123-130.
2. Rawal N (2005) Organization, function, and implementation of acute pain service. *Anesthesiol Clin North America* 23: 211-225.
3. Cogan J, Ouimette MF, Periz-Tomas B (2009) Levels of pain after cardiac surgery: A recent 4 week audit. Paper presented at the 6th Congress of the European Federation of IASP Chapters (EFIC), Lisbon, Portugal.
4. Taillefer MC, Carrier M, Belisle S, Levesque S, Lanctot H, et al. (2006) Prevalence, characteristics, and predictors of chronic nonanginal postoperative pain after a cardiac operation: a cross-sectional study. *J Thorac Cardiovasc Surg* 131: 1274-1280.
5. Watt-Watson J, Stevens B, Katz J, Costello J, Reid GJ, et al. (2004) Impact of preoperative education on pain outcomes after coronary artery bypass graft surgery. *Pain* 109: 73-85.
6. Lahtinen P, Kokki H, Hynynen M (2006) Pain after cardiac surgery: a prospective cohort study of 1-year incidence and intensity. *Anesthesiology* 105: 794-800.
7. Polomano RC, Dunwoody CJ, Krenzischek DA, Rathmell JP (2008) Perspective on pain management in the 21st century. *Pain Manag Nurs* 9: S3-S10.
8. Watt-Watson JCM (2010) Prevalence, characteristics, and risk factors of persistent post-operative pain after cardiac surgery. International Association for the Study of Pain Meeting, Montreal, Poster number 2956.
9. Powell AE, Davies HT, Bannister J, Macrae WA (2009) Challenge of improving postoperative pain management: case studies of three acute pain services in the UK National Health Service. *Br J Anaesth* 102: 824-831.
10. Rawal N (2002) Acute pain services revisited--good from far, far from good? *Reg Anesth Pain Med* 27: 117-121.
11. Rawal N, Berggren L (1994) Organization of acute pain services: a low-cost model. *Pain* 57: 117-123.
12. Cogan J, Ouimette MF, Vargas-Schaffer G, Yegin Z, Deschamps A, et al. (2013) Patient Attitudes and Beliefs Regarding Pain Medication after Cardiac Surgery: Barriers to Adequate Pain Management. *Pain Manag Nurs*.
13. Cogan J, Lalumière G, Yegi Z, Deschamps A, Rochon A (2012) Sex differences in the prevalence of chronic pain after cardiac surgery during a study using low dose ketamine infusions: a fortuitous finding?. Paper presented at the Society for Cardiovascular Anesthesia, Boston.
14. Kiecolt-G K, Page GG, Marucha PT, MacCallum RC, Glaser R (1998) Psychological influences on surgical recovery. Perspectives from psychoneuroimmunology. *Am Psychol* 53: 1209-1218.
15. Peters ML, Sommer M, de Rijke JM, Kessels F, Heineman E (2007) Somatic and psychologic predictors of long-term unfavorable outcome after surgical intervention. *Ann Surg* 245: 487-494.
16. Needleman J (1986) The essence of being a physician. *Western Journal of Medicine* 145: 185-186.