

Organization, Function, and Implementation of Acute Pain Service

Narinder Rawal, MD, PhD

Professor, Department of Anesthesiology and Intensive Care,
Orebro University Hospital, SE-70185, Orebro, Sweden

Introduction

Pain relief after surgery continues to be a major medical challenge. Improvement in perioperative analgesia is not only desirable for humanitarian reasons, but is also essential for its potential to reduce postoperative morbidity⁽¹⁻⁴⁾ and mortality⁽²⁾. Unrelieved postoperative pain may delay discharge and recovery and result in an inability to participate in rehabilitation programs leading to poor outcomes. Recent studies show that under-treatment of pain continues, despite the availability of drugs and techniques for its effective management. It is generally accepted that the solution to the problem of inadequate pain relief lies not so much in development of new analgesic drugs or technologies but in development of appropriate organization to exploit existing expertise⁽⁵⁾.

Although several authors in the late 1970's advocated the introduction of a pain management team to supervise and administer analgesics and to assume the responsibility for teaching and training in postoperative pain management, almost a decade passed before specialized in-hospital postoperative pain services emerged. Recently, various medical and health care organizations have recommended a widespread introduction of Acute Pain Service (APS)⁽⁶⁻¹²⁾. Furthermore, provision of an APS is presently a prerequisite for accreditation for training by the Royal College of Anaesthetists in the United Kingdom (UK) and the Australian and New Zealand College of Anaesthetists⁽¹³⁾.

Prevalence of Acute Pain Service

Table 1 shows the prevalence of APS in Europe, North America, Australia, and New Zealand⁽¹⁴⁻²⁷⁾. There appears to be an increase in number of hospitals with

APS worldwide. However, prevalence of APS does not mean much in the absence of established standards with respect to the structure and function of APS⁽²⁴⁾. The prevalence does not provide any indication as to the nature of service provided, the staffing and facilities of the service, the training and competence of the APS personnel, or the effectiveness of APS. Many hospitals consider their services adequate for their needs, although they have only some, but not all, components of APS⁽²⁰⁾. For example, a recent Canadian survey showed that the percent of academic hospitals with APS had increased from 53% in 1993 to 92% in 2004⁽²⁶⁾. However, APS, with anesthesiologists as the sole providers, had decreased from 36% to 22% due to growing clinical demands and reduced number of anesthesiologists. Only 44% of centers had a designated group of APS physicians while nursing representation was only 55%. Additionally, only 29% of centers reported having an ongoing prospective data collection system. The authors commented that no information was obtained about management of acute pain in patients not followed by the APS, which represented the vast majority of postoperative patients⁽²⁶⁾. Furthermore, recent evidence indicates that some APS face financial problems and may provide only a "token" service. Although there is a consensus that one of the major functions of an APS is to ensure safe and effective delivery of postoperative analgesia, many hospitals without an APS may also claim that they provide these services^(27, 28). However, it is important to differentiate between the advantages of the analgesic techniques themselves and those conferred by the increased specialist supervision and education provided by dedicated staff of APS. This suggests a need to develop standards with well-defined criteria on the basis of which the performance of APS can be evaluated and compared to national benchmarks⁽²⁷⁾.

Structure and Functions of Acute Pain Service

The original organizational model for managing post-operative pain was largely catalyzed by APS developed in the US⁽²¹⁾ and gradually introduced in the UK during the 1990s following the landmark report "Pain After Surgery"⁽⁷⁾. Yet the implementation of APS since 1990 has been "piecemeal" and haphazard, with successive reports up to the late 1990s providing evidence of significant variation within and between hospitals in the structure and function of APS⁽²⁷⁾.

Most major institutions in the US have an anesthesiology-based APS. The comprehensive pain management teams usually consist of staff anesthesiologists, resident anesthesiologists, specially trained nurses, pharmacists and physical therapists. Sometimes biomedical and infusion pump dispensing personnel are also included. Secretarial and billing personnel are also a part of US-style APS. Patients under the care of APS are visited and assessed regularly by members of the team. Anesthesiologist-based APS organization model usually provides "high tech" pain management service to patients receiving epidural analgesia and/or intravenous patient-controlled analgesia (IV-PCA). However, the costs of US-style APS are high and are being increasingly questioned by healthcare payers. In many institutions IV-PCA management has now been taken over by surgeons. A downsizing of many APS is taking place in US with further reductions predicted.

There is a clear need for new APS models which provide effective pain relief for all surgical patients. As discussed later, the nurse-based, anesthesiologist-supervised APS model may be an alternative to the conventional physician-based APS model. The UK Joint Colleges of Surgery and Anaesthesia Working Party Report recommended that a multidisciplinary team including specialist-nursing staff should run the APS. They further recommended that the services should assume day-to-day responsibility for the management of postoperative pain, "in-service" training for nursing and medical staff, research and audit⁽⁷⁾. Similar recommendations have been made by national expert committees from Australia⁽⁶⁾, USA^(8,10),

Germany⁽⁹⁾, Sweden⁽¹¹⁾, and again in an updated form by the American Society of Anesthesiologists (ASA) Task Force⁽¹²⁾. In the UK, two national surveys were conducted to determine the extent to which the recommendations of the Working Party Report had been implemented^(14,15). Unfortunately, there appeared to be a large degree of variation in what was thought to constitute an APS, and some hospitals had only some of the elements recommended by the Working Party Report^(18, 20).

An ideal APS organization should provide optimal pain management for every patient who undergoes surgery including children and those undergoing outpatient surgical procedures. The Joint Commission for Accreditation of Healthcare Organizations (JCAHO), an independent not-for-profit organization that sets healthcare standards in the US, recognizes this and now requires that hospitals assess, treat, and document patients' pain, guarantee the competence of their staff in pain assessment and management, and educate patients and their families about effective pain management. Hospitals must also consider the needs of ambulatory surgery patients for information and provide guidelines for pain management after discharge from the hospital⁽²⁹⁾.

One of the most important activities of an APS is to provide ongoing review of institutional policies and practice regarding pain control and mechanisms to deal with problems as they arise. The members of the program should meet regularly to provide feedback and discuss opportunities for further improvement. Such meetings are important to provide a forum for assessment of the efficiency of the APS, to highlight practical problems, and to find solutions to less-well-functioning aspects of the APS⁽³⁰⁾.

Although each institution may have different requirements for its APS and modifications of published models may be necessary to accommodate local conditions, the main components of an APS should include the following: ⁽¹⁾ designated personnel responsible for 24-h APS (in small hospitals 1 or 2 individuals may be adequate), ⁽²⁾ regular pain assessment (with appropriate scales for children and patients with cognitive impairment) at rest and movement, maintenance of

pain scores below a predetermined threshold, and regular documentation of pain scores (“make pain visible”),⁽³⁾ active cooperation with surgeons and ward nurses for development of protocols and critical pathways to achieve preset goals for postoperative mobilization and rehabilitation,⁽⁴⁾ ongoing teaching programs for ward nurses for provision of safe and cost-effective analgesic techniques,⁽⁵⁾ patient education regarding pain monitoring as well as treatment options, goals, benefits and adverse effects, and⁽⁶⁾ regular audit of cost-effectiveness of analgesic techniques and patient satisfaction of inpatients and outpatients⁽²⁹⁾.

Does an Acute Pain Service Improve Outcome?

It is believed that the introduction of APS has led to an increase in the appropriate use of specialized analgesic techniques, such as IV-PCA opioid and epidural and perineural analgesia. Implementation of these techniques may represent a true advance in improving analgesia and patient well-being as well as in reducing postoperative morbidity^(12, 13). In addition, an APS may reduce “analgesic gaps” that can occur during the transition from IV-PCA or epidural analgesia to oral analgesic therapy. Although evaluation of safety of analgesic techniques is an important objective of an APS, its role in preventing and reducing adverse events has not been well established. Wheatley et al⁽³¹⁾ reported a decrease in the incidence of lower respiratory tract infection from 1.3% to 0.4% after the introduction of an APS. Tsui et al⁽³³⁾ investigated the benefits of APS program in patients undergoing esophagectomy. The patients were either managed by an APS (n=299) or received conventional analgesic therapy in a non-APS setting (n=279). In the APS group, patients received postoperative epidural or systemic opioid infusion, and the non-APS group received intermittent IM morphine injections. A significantly lower incidence of pulmonary and cardiac complications and shorter hospital stay were reported in patients in the APS group⁽³²⁾. However, other studies have not found any reduction of hospital stay in patients managed by APS^(13, 33, 34).

In a recent literature review Werner et al⁽¹³⁾ evaluated effects of APS on postoperative outcome in 44 audits and 4 clinical trials, which included 84,097 postoperative patients. The authors found that implementation of APS was associated with a significant decrease in pain intensity. In addition, the introduction of an APS might have been associated with less postoperative nausea and vomiting and urinary retention. However, the authors could not draw clear conclusions about the side effects of analgesic modalities, patient satisfaction, or postoperative morbidity due to a large variability in the studies regarding APS function and the services provided⁽¹³⁾. McDonnell et al⁽³⁵⁾ found that implementation of APS was associated with initiatives that are hallmarks of good postoperative pain management, however, they did not explore the impact of APS on postoperative outcomes. Hospital administrators may be more likely to invest in APS if they are persuaded that this results in measurable improvements in patient outcomes at an affordable cost.

Is Acute Pain Service Cost-effective?

Cost-benefit analyses are necessary to justify the need for APS; however, no such studies have been conducted. Cost analyses of acute pain management are impeded by the lack of a well-defined baseline and outcome assessments. There is no valid method of assigning financial costs to differing levels of analgesia and the effect of various analgesic techniques on economic outcomes has not been adequately examined⁽¹³⁾. Cost-effective analyses of postoperative pain management have to consider not only the direct costs associated with the costs of analgesic drugs, devices, nursing and physician time, and duration of stay in the post anesthesia care unit, intensive care unit and/or surgical ward, as well as postoperative morbidity, but also the indirect costs of improved analgesia and patient satisfaction⁽¹³⁾.

Brodner et al⁽³⁶⁾ have shown that the introduction of a multimodal program with improved pain relief, stress reduction, and early tracheal extubation decreased the number of patients who required an intensive care unit stay in the immediate postoperative period after major surgery. Because of a faster discharge from the high dependency areas cost savings were achieved

(36). In an effort to reduce APS-related costs, several authors have advocated for a low-cost nurse-based, anesthesiologist-supervised model^(5,37-39) as an alternative to the more expensive physician-based multidisciplinary APS⁽³⁹⁻⁴²⁾. Currently, there is no evidence that a physician-based multidisciplinary APS is superior to a specialist nurse-based, anesthesiologist supervised APS. Although cost-benefit studies are difficult to perform there is a great need for such studies.

How to Implement An Acute Pain Service

It is becoming increasingly clear that simple and less expensive APS models have to be developed so as to cost-effectively improve the quality of postoperative analgesia for every surgical patient (including day surgery patients). At Örebro University Hospital, Örebro, Sweden, we have successfully implemented a specialist pain nurse-based, anesthesiologist-supervised model⁽⁵⁾. The first step toward initiating a pain management program is to organize an interdisciplinary team of interested and motivated individuals who represent diverse professional skills and approaches to patient care.

The section anesthesiologist has the overall responsibility for anesthetic care as well as for postoperative pain management. The anesthesiologist selects the appropriate analgesic modality based on the departmental policy of using the "acute pain analgesic ladder" (Fig. 1). In a recent ASA practice guidelines similar therapies are recommended⁽¹²⁾. The guidelines suggest that unless contraindicated, all patients should receive an "around-the-clock" regimen of non-steroidal anti-inflammatory drugs (NSAIDs), coxibs, or acetaminophen. In addition, regional blockade with local anesthetics should be considered. The choice of medication, dose, route, and duration of therapy should be individualized⁽¹²⁾. During regular working hours this anesthesiologist is available for consultation or any emergency, later the anesthesiologist on-call assumes the same function.

A specialist Acute Pain Nurse (APN) plays an important role in the APS. The duties of an APN are described in table 2. An APN makes daily rounds of all surgical wards. The postoperative pain therapy of indi-

vidual patients is based on standard orders and protocols developed jointly by the section anesthesiologist, surgeon and ward nurse. The APN facilitate collaboration among anesthesiologists, surgeons, and nurses on surgical wards. The clinical nurse specialists or APN educate ward nurses, give necessary support, and help initiate and supervise analgesia. This gives the ward nurses the flexibility to administer the analgesics when necessary.

Upgrading The Role of Ward Nurses

Our model is based on the concept that postoperative pain relief can be greatly improved by provision of "in-service" training for surgical nursing staff with respect to optimal use of IV-PCA opioids and regional analgesia techniques⁽⁵⁾. Nurses on surgical wards have the responsibility for assessing the patient's pain intensity, administering prescribed analgesic treatments, monitoring their efficacy and adverse effects, and monitoring the extent of regional block. At our institution ward nurses have been allowed to administer IV opioids, set up IV-PCA devices, manage epidural analgesia, and change IV-PCA and epidural analgesia drug administration parameters (within prescribed limits). Of note, the nurses were not allowed to do this at the time of implementation of APS in 1991. Regular teaching, daily visits by APN have resulted in effective and safe pain relief, this is confirmed by our annual audit data. The "pain representatives" from each surgical ward meet regularly with the anesthesiologist and the APN to discuss improvements based on annual audit data.

The nursing role must be upgraded if postoperative pain management is to improve on surgical wards. In many countries and institutions, ward nurses are not allowed to administer IV or epidural opioids and are required to call APS physicians for IV-PCA and epidural analgesia dose adjustments. This is time consuming, cost-ineffective, and unnecessary. These restrictions for ward nurses are surprising in view of the increasing trends towards self-treatment by patients. Outside hospitals, diabetic children are allowed to self-administer insulin and cancer patients are allowed to self-administer epidural and intrathecal analgesics. The use of home ventilators, home dialy-

sis, home-PCA devices, and opioids in non-cancer pain is increasingly accepted. Notably, in many hospitals, midwives are allowed to manage epidural analgesia for labor pain, but ward nurses are not allowed to do the same for postoperative pain. There is convincing evidence from many countries and institutions that with appropriate teaching and training, ward nurses can monitor and manage analgesic modalities, such as IV-PCA and epidural analgesia. Nurse education is widely recognized as an important priority in pain management^(5,20, 29, 30, 40). Recent studies have demonstrated the importance of the ward nurses in improving the efficacy of analgesic regimens^(5,20, 40, 41). Surgeon and ward nurse participation are crucial in this model.

Defining Maximum Acceptable Pain Scores and “Making Pain Visible”

One of the responsibilities of the ward nurse is regular documentation of each patient’s pain intensity, using the VAS, every 3 h and documentation of treatment efficacy on a “vital sign” chart is the cornerstone of this model. This assessment includes pain at rest and during movement and also before and after an intervention. In the absence of formal, documented pain assessment, many medical and nursing staff continue to believe that patients who do not report pain do not feel pain. Patients should be informed that their pain will be maintained at or below a predefined threshold level (generally 3 on a 10-point VAS) and that pain scores in excess of the threshold will trigger interventions to reduce pain⁽²⁹⁾. It is therefore essential that a maximum acceptable pain score is defined and pain intensity is routinely documented before and after analgesic treatment. A VAS above 3 is promptly treated. Documentation also provides data for audit and facilitates review and improvement of care. Quality assurance measures can no longer be ignored.

Role of The Surgeon

Although all guidelines emphasize the importance of a multidisciplinary APS as a tool to improve postoperative pain relief, in the literature, no distinction has been made in the role of individual members of the

multidisciplinary team. The role of the surgeon is far more important, than say, that of the pharmacist: indeed it would be no exaggeration to state that an APS without surgeon cooperation is doomed to fail. Surgeon participation is important for several reasons: ⁽¹⁾ development of protocols for all analgesic techniques, keeping in mind that a majority of surgical patients may not need epidural analgesia or IV-PCA techniques for effective analgesia, ⁽²⁾ development of clinical pathways to achieve preset goals for postoperative mobilization and rehabilitation, which can be expected to reduce hospital stay, ⁽³⁾ strategies for pain management after outpatient surgery (up to 70% of surgical population and increasing), and ⁽⁴⁾ improved ward nurse compliance for implementation of APS goals including frequent pain assessment and documentation⁽²⁹⁾.

Education

One of the most basic, yet essential, activities of an APS is to develop and implement educational programs for patients and health care providers. For patients, the educational process should begin at the time of the preoperative evaluation. Traditionally, patients have assumed that pain after surgery is inevitable, they are unlikely to be aware of the standard of care they can expect to receive and the potential benefits of effective pain relief. Content should include the following: the importance of adequate pain control, the commitment of hospital staff to provide effective pain control, the various options available to manage postoperative pain, practical information about how to report pain intensity (e.g. visual analog scale (VAS) or numerical scale) and how to participate in the pain management plan^(5, 29, 30).

Specialist Pain Nurse-Based APS-Does It Work?

In the model described above, the only additional cost is that of two APNs. At our hospital about 16,000 surgical procedures are performed each year, our low-cost model is designed to benefit all patients (about € 3 per patient excluding drug and equipment costs). Regular audits have confirmed that the aims of our APS are achieved in over 90% of patients. The number of times anesthesiologists are consulted or called

has decreased over the years; currently it is in the range of 1-2 consultations a week. However, our latest audit showed the need for a more detailed comparison of nighttime and daytime pain relief.

The general principles for this organization model have been accepted and recommended for Swedish hospitals by the Swedish Medical Association ⁽¹¹⁾. Based on our model Bardiau et al ⁽⁴⁰⁾ have described the implementation of an APS in a Belgian general hospital of 1,005 beds, of which 240 were surgical beds. The process was divided into 8 stages over a 3-year period. This program anticipated an improvement in postoperative pain relief for all surgical inpatients and the maintenance of this service over time. First, a pain management committee (PMC) was formed, including anesthesiologists, surgeons, pharmacists, and nurses. The next month a survey of nurses' attitudes and knowledge of postoperative care was conducted using an anonymous 35-item questionnaire. The following month a 10-cm VAS device was introduced to assess pain intensity routinely. Then for a 6-month period, a baseline survey (survey I) was designed to analyze current practices of pain treatment. Following that specialist nurse-based, anesthesiologist-supervised APS model was implemented. Standardized treatment protocols included regular assessments of pain intensity using VAS every 4 hours and documentation of treatment efficacy by the APN as well as use of analgesic regimens developed by the PMC. Three months later, a second survey (survey II) of 671 patients was conducted to assess the effect of APS implementation. Finally, a third confirmation survey (survey III) of 2383 patients was conducted to investigate whether the initial improvements were maintained.

The survey of nurses identified a lack of knowledge and skills among nurses in assessing and managing pain effectively because of the absence of nursing guidelines and pain treatment protocols. Pain relief improved significantly after the implementation of the APS. In addition, acetaminophen consumption increased significantly, while use of NSAIDs increased from 20% in survey I to 64% and 99% in surveys II and III, respectively. At the same time opioid consumption decreased. The authors concluded

that standardization of analgesic therapies, nursing practice, and regular feedback on performance is essential factors to improve pain management. Organizing teams of anesthesiologists, surgeons, and nurses is necessary for this improvement. Cost-benefit analyses are now needed to further substantiate these results ⁽⁴⁰⁾.

Audits and Continuous Quality Improvement of Acute Pain Service

Audit is a monitoring and evaluation process that should help recognize those situations on which attention should be focused and the analysis of specific aspects of clinical practice leads to the setting of standards against which future practice can be measured and evaluated. Regular audits will show if the goals of APS are achieved ⁽²⁹⁾. Audits of APS are necessary to assess quality of pain management and to evaluate the adverse events of analgesic techniques such as IV-PCA opioid, epidural analgesia, and peripheral blocks. Such audits would show any problems with these techniques and need for change in practice. An audit was carried out in the Northern and Yorkshire region in UK to assess postoperative pain management outcomes ⁽⁴¹⁾. All patients undergoing surgical procedures over a two-week period, in 16 hospitals, ranging from large teaching hospitals with 5,500 beds to smaller district general hospitals with fewer than 400 beds were included in the study. Pain scores, at rest and on movement, were obtained in the recovery room, at 24 hours, and at seven days postoperatively. Data were also collected on the modalities of pain management. The results showed that a large percentage of patients reported unacceptable levels of pain despite changes in practice and the development of APS. Sites with pain management teams (i.e., APS) did not provide better pain management than those without APS ⁽⁴¹⁾. Stamer et al. ⁽²⁴⁾ reviewed the literature on APS and concluded that in spite of guidelines, most APS worldwide did not meet basic quality criteria, which were defined as: regular assessment and documentation of pain scores at least once a day, written protocols for pain management, personnel assignment for APS, and policies for postoperative pain management during nights and weekends. These studies emphasize the need for

regular audits to address the problems of APS and to justify their costs. Unfortunately, the literature on APS audits is limited.

Future perspectives

The aims of APS have expanded to embrace not merely a reduction of pain intensity, but also the promotion of postoperative comfort and rehabilitation. The widening of objectives, together with the insidious elevation of standards and expectations, have placed a burden on an old order that is often ill equipped to serve the new ambitions ⁽⁴²⁾. Evidence that the standards are improving can be found in the way that pain is assessed. As pain control has improved, its evaluation has become more demanding. Whilst the goal of pain management remains a reduction in pain intensity, it is no longer sufficient to measure efficacy at rest, but also on mobilization and on coughing for abdominal and thoracic surgery. Expanding the multidisciplinary approach could extend the role of APS through the entire postoperative course including patient rehabilitation. Such widening of the role might not only improve overall patient care, but might convince hospital managers that APS are worthy of support ⁽⁴²⁾.

Central to concerns about out-of-hours care is the debate about whether the key role of APS is to provide a hands-on direct patient care or provide a resource for education and training, and promotion of good clinical practice. Powell et al ⁽²⁷⁾ argue that if an APS is well resourced and able to institute widespread organizational and attitudinal changes required to overcome barriers to pain management, even a daytime APS, would promote and maintain good clinical practice over the 24-hour period ⁽²⁷⁾. However, the fact that many patients perceive pain at night as more severe ⁽⁴⁴⁾, the current "office hours" model of APS which only covers around 50 hours of the 168 hours in a week would seem destined to leave many patients in pain ⁽²⁷⁾.

In the UK there has been debate about the future direction of APS. Suggested developments include: integration of APS with other pain services (i.e., chronic and palliative care), alignment with critical care outreach teams, and the development of comprehensive postoperative rehabilitation programs

which would include APS ⁽⁴³⁾. Integration of APS with other pain services (e.g., chronic pain, palliative care) may not be appropriate because the practical issues related to management of postoperative pain are entirely different from chronic pain. The APS anesthesiologist is involved with the pre-, intra- and postoperative phases including performing, teaching and training of regional anesthesia. However, not all chronic pain services include anesthesiologists. Even if the chronic pain physicians are anesthesiologists, they are rarely involved with delivery of anesthesia per se and may not be familiar with the day-to-day practical issues of postoperative pain management on surgical wards. Therefore, it is unclear if the problems of postoperative pain can be solved by the development of a more comprehensive service ⁽²⁷⁾. In our institution the organization of APS is separate from that of chronic pain. There is good cooperation between the two teams for chronic pain patients who undergo surgery, patients with drug problems and patients with postoperative complications where long-term pain relief may be necessary. For organizational purposes after postoperative day 7 the chronic pain team takes over the management of the patient from the APS.

The APS plays a unique educational role, which might be further expanded as other healthcare providers are incorporated into the team. In the authors' opinion, the key role of the APS may not be to provide a hands-on direct patient care but to provide a resource for education and training as well as promotion of good practice based on algorithms and protocols developed jointly by anesthesiologists, surgeons, and nurses. These protocols have to be integrated into pre-defined clinical pathways for each surgical procedure. Furthermore, the integration of newly developed web-based, evidence-based procedure-specific guidelines into APS protocol ⁽⁴⁵⁻⁴⁸⁾, should further optimize postoperative analgesia and outcome. These guidelines allow practitioners to modify analgesic therapies based upon local circumstances (e.g., regulatory issues, availability of drugs and their costs) (see chapter 12).

Summary

Freedom from postoperative pain is a central concern of surgical patients and alleviation of pain may con-

tribute to improved clinical outcomes. However, despite long-standing recognition, under-treatment of postoperative pain continues to be a major problem internationally. It is clear that the introduction of APS has increased the awareness that adequate postoperative pain management contributes to patients' well being. It has become increasingly evident that an organized multidisciplinary team of dedicated physicians and nurses seems a fundamental prerequisite for a well-functioning APS program. Although controlled trials are not available, observational studies suggest the effectiveness of an APS in reducing postoperative pain and analgesic adverse effects. In addition, integration of the newer web-based surgical procedure-specific initiatives that provide evidence-based recommendations and allow the clinician to select appropriate analgesic techniques may further improve the efficacy of APS.

The number of hospitals with APS are increasing, however, there is no consensus regarding the optimal structure and function of an APS. Selection of an appropriate organizational structure may be as important to the success of the APS as the choice of analgesic modalities. In addition, there is an obvious need for developing well-defined criteria on the basis of which the performance of an APS at an individual hospital can be evaluated and compared to national standards. It is important to recognize that quality improvement initiatives must be specifically tailored to the local environment, as there is no single approach that is guaranteed to be successful in all settings. APS will also have to document their value and demonstrate the justification of allotted resources and expertise. Finally, the integration of effective analgesia into surgical care is mandatory to improve outcome and will depend on close cooperation between the surgeons and anesthesiologists.

Acknowledgement

The author wishes to acknowledge the excellent secretarial assistance of Marianne Welamsson.

References

1. Ballantyne JC, Carr DB, deFerranti S, et al. The comparative effects of postoperative analgesic therapies on pulmonary outcome: cumulative meta-analyses of randomized, controlled trials. *Anesth Analg* 1998; 86: 598-612.
2. Rodgers A, Walker N, Schug S, et al. Reduction of postoperative mortality and morbidity with epidural or spinal anaesthesia: results from overview of randomised trials. *BMJ* 2000;321.
3. Kehlet H, Holte K. Effect of postoperative analgesia reduces on surgical outcome. *Br J Anaesth* 2001;87:62-72.
4. Beattie WS, Badner NH, Choi P. Epidural analgesia reduces postoperative myocardial infarction: a meta-analysis. *Anesth Analg* 2001;93:853-8.
5. Rawal N, Berggren L. Organization of acute pain services – a low cost model. *Pain* 1994;57:117-123.
6. National Health & Medical Research Council of Australia. Acute pain management scientific evidence. Canberra, Australia: Ausinfo, 1999.
7. Royal College of Surgeons and College of Anaesthetists Working Party on Pain After Surgery. Pain after surgery. London: Royal College of Surgeons, 1990.
8. US Department of Health and Human Services, Agency for Health Care Policy and Research. Acute pain management: operative and medical procedures and trauma. Publication No. 92-0032. Rockville, MD: AHCPR Publications, 1992.
9. Wulf H, Neugebauer E, Maier C, Die behandlung akuter perioperativer und posttraumatischer schmerzen: empfehlungen einer interdisziplinären expertenkommission. New York: G. Thieme, 1997.
10. Joint Commission on Accreditation of Healthcare Organizations. 1992 Hospital accreditation standards. Oakbrook Terrace, IL:JCAHO, 2001.
11. Behandling av postoperativ smärta, riktlinjer och kvalitetsindikatorer (Treatment of postoperative pain, guidelines, and quality indicators). Svenska Läkaresällskapet (Swedish Medical Association), Förlagshuset Gothia AB, Stockholm, www.gothia.nu 2001
12. Practice guidelines for acute pain management in the perioperative setting. An updated report by American Society of Anesthesiologists. Task Force on acute pain management. *Anesthesiology* 2004;100:1573-81.
13. Werner MU, Søholm L, Rotbøll-Nielsen P, Kehlet H. Does an Acute Pain Service improve postoperative outcome? *Anesth Analg* 2002;95:1361-72.
14. Zimmerman DL, Stewart J. Postoperative pain management and acute pain service activity in Canada. *Can J Anaesth* 1993;40:568-75.
15. Goucke CR, Owe H. Acute pain management in Australia and New Zealand. *Anaesth Intensive Care* 1995;23:715-7.
16. Rawal N, Allvin R. Acute pain services in Europe: a 17-nation survey of 105 hospitals. The EuroPain Acute Pain Working Party. *Eur J Anaesthesiol* 1998;15:354-63.
17. Davies K. Findings of a national survey of acute pain services. *Nurs Times* 1996;92:31-3.14.
18. Windsor AM, Glynn CJ, Mason DG. National provision of acute pain services. *Anaesthesia* 1996;51:228-31.
19. Merry A, Jugde MA, Ready B. Acute pain services in New Zealand hospitals: a survey. *N Z Med J* 1997; 110: 233-5.
20. Harmer M, Davies KA. The effect of education, assessment and a standardized prescription on postoperative pain management: the value of clinical audit in the establishment of acute pain services. *Anaesthesia* 1998;53:424.
21. Ready LB. How many acute pain services are there in the United States, and who is managing patient-controlled analgesia (letter)? *Anesthesiology* 1995;82:322.
22. Warfield CA, Kahn CH. Acute pain management: programs in US hospitals and experiences and attitudes among US adults. *Anesthesiology* 1995;83:1090-4.
23. Neugebauer E, Hempel K, Sauerland S, et al. The status of perioperative pain therapy in Germany: results of a representative, anonymous survey of 1,000 surgical clinics – Pain Study Group. *Chirurg* 1998;69:461-6.
24. Stamer UM, Mpasios N, Stuber F, Maier C. A survey of acute pain services in Germany and a discussion of international survey data. *Reg Anesth Pain Med* 2002; 27:125-31.

25. O'Higgins, Tuckey JP. Thoracic epidural anaesthesia and analgesia: United Kingdom practice. *Acta Anaesthesiol Scand* 2000;44:1087-92.
26. Goldstein DH, Van Den Kerkhof EG, Blaine WC. Acute pain management services have progressed albeit insufficiently in Canadian academic hospitals. *Can J Anesth* 2004;51:231-5.
27. Powell AE, Davies HTO, Bannister J, Macrae WA. Rhetoric and reality on acute pain services in the UK: a national postal questionnaire survey. *Br J Anaesth* 2004;92:689-93.
28. Harmer M. When is a standard, not a standard? When is it a recommendation? (Editorial) *Anaesthesia* 2001;56:611-612.
29. Rawal N. Acute Pain Services revisited – good from far, far from good? (Editorial). *Reg Anesth Pain Med* 2002;27:117-121.
30. Blau WS, Dalton AB, Lindley C. Organization of hospital-based acute pain management programs. *Southern Med J* 1999;92:465-471.
31. Wheatley RG, Madej TH, Jackson IJ, Hunter D. The first year's experience of an acute pain service. *Br J Anaesth* 1991;67:353-9.
32. Tsui SL, Law S, Fok M, et al. Postoperative analgesia reduces mortality and morbidity after esophagectomy. *Am J Surg* 1997;173:472-8.
33. Lempa M, Gerards P, Koch G, et al. Efficacy of an Acute Pain Service – a controlled comparative study of hospitals. *Langenbecks Arch Chir Suppl Kongressbd* 1998;115:673-6.
34. Rose DK, Cohen MM, Yee DA. Changing the practice of pain management. *Anesth Analg* 1997;84:764-72.
35. McDonnell A, Nicholl J, Read S. Acute Pain Teams in England: current provision and their role in postoperative pain management. *J Clin Nurs* 2003;12:387-393.
36. Brodner G, Mertes N, Buerkle H, et al. Acute pain management: analysis, implications and consequences after prospective experience with 6349 surgical patients. *Eur J Anaesthesiol* 2000;17:566-75.
37. Coleman SA, Booker-Milburn J. Audit of postoperative pain control: influence of a dedicated acute pain nurse. *Anaesthesia* 1996;51:1093-6.
38. Mackintosh C, Bowles S. Evaluation of a nurse-led acute pain service: can clinical nurse specialists make a difference? *J Adv Nurse* 1997;25:30-7.
39. Bardiau FM, Braeckman MM, Seidel L, Albert A, Boogaerts JG. Effectiveness of an acute pain service inception in a general hospital. *J Clin Anesth* 1999;11:583-9.
40. Bardiau FM, Taviaux NF, Albert A, et al. An intervention study to enhance postoperative pain management. *Anesth Analg*. 2003;96:179-185.
41. Taverner T. A regional pain management audit. *Nurs Times* 2003;99:34-37.
42. Bonnet F. Postoperative pain management: a continuing struggle. *European Society of Anaesthesiologists Newsletter* 2004;17:8-9.
43. Counsell DJ. The acute pain service: A model for outreach critical care. *Anaesthesia* 2001;56:925-6.
44. Closs S, Briggs M, Everitt VE. Implementation of research findings to reduce postoperative pain at night. *Int J Nurs Stud* 1999;36:21-31.
45. Rosenquist RW, Rosenberg J. Postoperative pain guidelines. *Reg Anesth Pain Med* 2003;28:279-288.
46. Rowlingson JC, Rawal N. Postoperative pain guidelines – targeted to the site of surgery. *Reg Anesth Pain Med* 2003;28:265-267.
47. Rawal N, McCloy RF and PROSPECT Working group. Incisional and intraperitoneal local anaesthetics in laparoscopic cholecystectomy and abdominal hysterectomy: a systematic review. *Reg Anesth Pain Med* 2004;29:A307.
48. Fischer B, Camu F, and PROSPECT Working Group. Comparative benefits of epidural analgesia following hysterectomy and colonic resection. *Reg Anesth Pain Med* 2004; 29: A309.

Table 1: National Surveys of the Prevalence of Acute Pain Services

FIRST AUTHOR	REGION/COUNTRY	SURVEY YEAR	PREVALENCE ^a
Zimmerman (14)	Canada	1991	24/47 (53 %)*
Goucke (15)	Australia, New Zealand	1992/1993	37/111 (33 %)
Rawal (16)	Europe	1993	37/105 (34 %)
Davies (17)	UK	1994	77/221 (35 %)*
Windsor (18)	UK	1994 ^b	151/354 (43 %)
		1990	(10/358 (3 %))
Merry (19)	New Zealand	1994	12/62 (19 %)
		1996	17/22 ^c
Harmer (20)	UK	1995 ^d	97/221 (44 %)*
Ready ^e (21)	US	1995	236/324 (73 %)
Warfield (22)	US	1995	126/300 (42 %)
Neugebauer (23)	Germany	1997	390/1000 (39 %)
Stamer (24)	Germany	1999	161/446 (36 %)
O'Higgins (25)	UK	2000 ^d	> 49 % ^f
Goldstein (26)	Canada	2004	50/62 (93 %)*
Powell (27)	UK	2004	270/325 (83 %)

a Formal Acute Pain Service = provision of staff and funding

b Survey was conducted in 1994 and contained a retrospective analysis of 1990 data

c This part of the survey included only 22 publicly funded Crown Health Enterprises with ≥ 150 beds

d Year of survey not stated

e Letter

f A total of 118 of 240 Anaesthetic College tutors confirmed the presence of an acute pain team to review epidural analgesia on the wards

* Only university affiliated

Adapted from: Werner MU, et al. (13)

Table 2: Organization of acute pain services at Örebro University Hospital, Örebro, Sweden

HEALTHCARE MEMBER 'PAIN REPRESENTATIVES'	RESPONSIBILITIES
Director Acute Pain Service	Responsible for coordinating hospital-wide acute pain service and education
Section anesthesiologists	Responsible for pre-, intra-, and postoperative care (including postoperative pain) for their surgical section
'Pain representative' ward surgeons	Responsible for pain management for their surgical ward. Helps integration of analgesia techniques into clinical pathways for individual surgical procedures
'Pain representative' day/night nurses	Responsible for implementation of pain management guidelines and monitoring on the ward*
Acute pain nurse (specialist pain nurse)	<ul style="list-style-type: none"> • Daily rounds of all surgical wards • Data collection for audits • 'Trouble-shoot' technical problems • Refer problem patients to section anesthesiologist (link between surgical ward and anesthesiologist) • 'Bedside' teaching of ward nurses

* Patients are treated on the basis of standard orders and protocols developed jointly by chiefs of anesthesiology, surgery, and nursing. Pain representatives meet every 3 months to discuss and implement necessary improvements.

Table 3: How can postoperative pain management be improved?

Anesthesiologists	Selection of evidence-based analgesic techniques, education, supervision of acute pain nurse
Acute Pain Nurse	Bedside teaching of ward nurses, 'trouble shooting, regular audit of acute pain service
On wards	'Make pain visible' (regular pain assessment and documentation) Allow ward nurses to treat pain based on standardized protocols
Surgeon	Pre-set goals for postoperative mobilization and rehabilitation
Hospital administration	Hospital-wide pain management policy

WORKSHOPS

A variety of hands-on
workshops will be available
in the second half of 2006

1. Hand-on Regional Anaesthesia with Cadavers -
@ department of anatomy University of Pretoria
2. Hands-on Advanced Workshop (or, alternatively, "Blocks for Pain") – at Little Company of Mary Hospital. Using cadavers and C-arm X-ray imaging for performing of certain blocks.

Workshops presented by:

Dr Russell Raath – Anaesthesiologist

Chairman RAPSA

Editor South African Journal of Regional Anaesthesia

Honorary Lecturer Department of Anatomy University of Pretoria

AND

Dr Corrie Avenant – Anaesthesiologist

Operator of Pain Clinic at Wilgmed Hospital

**1st "Advanced Workshop"
to be held on 22 July 2006**

To book please contact: Velmie on 083 458 5227

Phone Velmie also for more information on future workshop dates.



Perfalgan® 1g
Paracetamol 100 ml solution
for infusion

- Indicated for the treatment of mild to moderate post-operative pain
- Fast onset of action – pain relief as early as 5 minutes^{1*}
- Analgesic effect comparable to morphine 10 mg IM and ketorolac 30 mg IV^{2,3*}
- Proven opioid-sparing effect^{4*}
- Recognised safety profile of paracetamol^{5,6}
- Ready to use in patients with an IV line

* IV paracetamol 1 g (Perfalgan®) is therapeutically equivalent to IV propacetamol 2 g⁷

Release the true potential of paracetamol

References:

1. Møller PL, Sindet-Pedersen S, Petersen CT et al. Onset of acetaminophen analgesia: comparison of oral and intravenous routes after third molar surgery. *Br J Anaesth* 2005;**94**(5):642-648.
2. Van Aken H, Thys L, Veekman L et al. Assessing Analgesia in Single and Repeated Administrations of Propacetamol for Postoperative Pain: Comparison with Morphine After Dental Surgery. *Anesth Analg* 2004;**98**:159-165.
3. Zhou T.J., Tang J., White P.E. Propacetamol Versus Ketorolac for Treatment of Acute Postoperative Pain After Total Hip or Knee Replacement. *Anesth Analg* 2001;**92**:1569-1575.
4. Peduto VA and the Italian Collaborative Group on Propacetamol, Ballabio M, Stekani S. Efficacy of propacetamol in treatment of postoperative pain. Morphine-sparing effect in orthopedic surgery. *Acta Anaesthesiol Scand* 1998;**42**:293-298.
5. Sinatra RS, Jahr JS, Reynolds LW, et al. Efficacy and Safety of Single and Repeated Administration of 1 gram Intravenous Acetaminophen Injection (Paracetamol) for Pain Management after Major Orthopedic Surgery. *Anesthesiol* 2005;**102**:892-891
6. Prescott LF. Paracetamol: Past, Present, and Future. *Am J Therapeut* 2000;**7**:143-147.
7. Flouvat B, Leneveu A, Fitoussi S, et al. Bioequivalence study comparing a new paracetamol solution for injection and propacetamol after single intravenous infusion in healthy subjects. *Int J Clin Pharmacol Therapeut* 2004;**42**(1):50-57.

 **Bristol-Myers Squibb**
extending and enhancing human life

47 Van Buuren Rd., Bedfordview, P.O. Box 1408, Bedfordview 2008, South Africa. Tel: (011) 456-6400 Fax: (011) 456-6579.

S3 **PERFALGAN® 1g (Paracetamol). Solution for Infusion.** Each 100 ml vial contains 1 g paracetamol as active ingredient. Preservative: Cysteine hydrochloride monohydrate 0.25 % w/v. **Registration number:** A338/3.2/0561. **Pharmacological classification:** 3.2 Analgesic and antipyretic. **Indications:** Perfalgan® 1g is indicated for the short-term treatment (not exceeding 24 hours) of mild to moderate pain e.g. post dental procedures and post-operative minor orthopaedic procedures when the oral route is unsuitable. **Dosage:** Adults and adolescents weighing more than 50 kg: Perfalgan® 1g per administration, i.e. one 100 ml vial, up to four times a day. The minimum interval between each administration must be 4 hours. The maximum daily dose must not exceed 4 g. Children weighing more than 33 kg (approximately 11 years old), adolescents and adults weighing less than 50 kg: Perfalgan® 1g: 15 mg/kg per administration, i.e. 1.5 ml solution per kg. The administration interval between each administration must be 4 hours. The maximum daily dose must not exceed 60 mg/kg (without exceeding 4 g). **Side-effects:** Adverse reactions to Perfalgan® 1g are malaise, hypotension, increased levels of hepatic transaminases (rare) or hypersensitivity (very rare). Isolated reports of thrombocytopenia. **Special precautions:** Perfalgan® 1g should be used with caution in cases of hepatocellular insufficiency, severe renal insufficiency (creatinine clearance < 30 ml/min), chronic alcoholism, chronic malnutrition (low reserves of hepatic glutathione), dehydration. **Contraindications:** cases of hypersensitivity to paracetamol or to paracetamol hydrochloride (prodrug of paracetamol) or to any of the excipients; cases of severe hepatocellular insufficiency, children weighing less than 33 kg (approximately 11 years old) as safety and efficacy have not been established. **Warnings:** It is recommended to use a suitable oral analgesic treatment as soon as this administration route is possible. In order to avoid the risk of overdose, check that other medicines administered do not contain paracetamol. Doses of Perfalgan® in excess of those recommended may cause severe liver damage. Clinical symptoms and signs of liver damage are usually seen first after two days with a maximum usually after 4-6 days. Treatment with antidote should be given as soon as possible (see package insert). In the event of overdose or suspected overdose and notwithstanding the fact that the person may be asymptomatic, the nearest doctor, hospital or Poison Centre must be contacted immediately. Patients suffering from hepatitis or alcoholism, or recovering from any form of liver disease should not take excessive quantities of Perfalgan®. Use with caution in renal disease. **Name and business address of the holder of the certificate of Registration:** Bristol-Myers Squibb (Pty) Ltd, 47 Van Buuren Road, Bedfordview, 2008. For further information refer to the package insert. Date: October 2005

Targeted anaesthetic control



Unique, opioid-based anaesthesia gives you **hands-on control!** During induction and/or maintenance of inhalation anaesthesia, targeted control with ULTIVA® is **immediate***¹ and **predictable**.²

Signature of Precision



GlaxoSmithKline

Ultiva®

Remifentanil HCl For Injection

ANAESTHESIA

* Remifentanil achieves peak effect within the effect site approximately 1-2 minutes following bolus injection.

1. Miller DR. Intravenous anaesthesia: new drugs, new concepts, and clinical applications. *Can J Anaesth* 1996;43(5):142-148. 2. Patel SS, Spencer CM. Remifentanil. *Drugs* 1996;52(3):417-427.

ULTIVA® Injection. Reg. No. 31/2.9/0078. Each ULTIVA® vial contains remifentanil hydrochloride equivalent to 1 mg remifentanil base. ULTIVA® 2 Injection. Reg. No. 31/2.9/0079. Each ULTIVA® 2 vial contains remifentanil hydrochloride equivalent to 2 mg remifentanil base. ULTIVA® 5 Injection. Reg. No. 31/2.9/0080. Each ULTIVA® 5 vial contains remifentanil hydrochloride equivalent to 5 mg remifentanil base. GlaxoSmithKline South Africa (Pty.) Ltd., (Co. Reg. No. 1948/030135/07). P.O. Box 3388, Halfway House 1685. Tel. +27 11 313 6000. Fax. +27 11 313 6111.

UI/1202/027