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Modena, Roma* (Italy)

Saturday June 5, 2004

13:00-13:45

Room 5A

INTRODUCTION

In ambulatory surgery, postoperative pain is reported as a major factor of patient dissatisfaction and represents a frequent cause of unplanned overnight admission.

In 2003, a SIAARTI Task Force was charged to draft, as completion of a previously issued document on ambulatory anaesthesia [1], guidelines on this subject.

In accordance with United States Preventive Service Task Force, the guidelines have been conceived on the base of the literature evidence, as follows:

- Evidence supported by wide randomized controlled trials subject to meta-analysis (standard level for therapy guidelines)
- Evidence supported by properly designed randomized trials
- Evidence supported by properly designed, non randomised trials or multicenter, multi-time case-control studies
- Expert advice, based on clinical experience, descriptive studies or reports.

These guidelines are congruent with two previously issued SIAARTI documents, on informed consent to anesthesia [2] and on postoperative pain treatment [3].

In order to obtain a wider validation, a mutual agreement process with other professionals involved in the ambulatory surgery process such as surgeons and nurses, and with customer associations such as Tribunale del Malato is now in progress.

A guidelines revision process is planned 5 years after implementation.

Panel of experts: C. Mattia, M. Solca, G. Savoia, G. Bettelli, F. Ambrosio, M. Berti, L. Bertini, D. Celleno, F. Coluzzi, G. Fanelli, G. Finco, C. Giorgini, F. Giunta, M. Loreto, E. Mondello, F. Paoletti, F. Paolicchi, F. Petri, G. Pittoni, G. Varrassi.

GENERAL ASPECTS

During the first hours after ambulatory surgery, recurrence of postoperative pain is estimated as high as 40%, and may affect the rate of discharge consistently [4-7]. Pain after ambulatory surgery is influenced by various factors, such as:

- surgery (type, duration and anatomical location)
- anaesthesia (different techniques, quality/quantity of anaesthetic drugs preoperatively administered)
- analgesic drugs pre, intra and postoperatively administered
- factors related to the patient himself (body mass index, coexisting therapies, social/cultural factors).

Incisional pain is common after laparoscopic and arthroscopic procedures [8, 9]. Pre-incisional anaesthetic infiltration improves postoperative pain control [10].

In a modern idea of peri-operative medicine, effective organisation, multi-modality and team approach should be at the basis of effective pain treatment.

Education in ambulatory surgery should provide an adequate degree of information on this subject [11]

EVIDENCE BASED PRINCIPLES

Multimodality: pain treatment should be established following multi-modal approach (evidence level: A). Combined action of NSAIDs, paracetamol, opioids (codeine, tramadol) and local anaesthetics, peri-operatively administered by different routes should be employed (evidence level: A-C).

Side-effects: anti COX-2, NSAIDs and major opioids should be carefully used and/or prescribed, due to possible side effects (NSAIDs: gastric or surgical bleeding, renal damage; major opioids: respiratory depression, PONV, excessive sedation, constipation; short half-life intra-operative opioids such as alfentanil or remifentanil: postoperative hyperalgesia that could interfere with discharge) (evidence level: B).

Anti COX-2 NSAIDs: recent literature demonstrates advantages of some prevalent anti COX-2 or selective anti COX-2 drugs (COXIB), administered peri-operatively (evidence level: B).

Anaesthesia techniques: in the perspective of a multimodal approach to pain, regional anaesthesia techniques should be preferred (evidence level: A-B). When using central blocks, complete reversal of the motor block and spontaneous voiding should be required before discharge (evidence level: B). In case of residual motor block at a single limb following peripheral, single-shot or continuous, nerve blocks, written instructions should be given to the patient in order to allow safe discharge (evidence level: D).

Pain scores at discharge: a condition of no pain or little pain should be required to allow discharge, and this symptom should be included in every discharge score, in order to avoid overnight admissions due to intractable pain at home (evidence level: A). Pain evaluation scores should be simple, and patients and their relatives/guardians should be able to use them easily when interacting with the facility team (evidence level: A). Given the importance of his involvement in the process, information on the means adopted for pain control should be part of the information addressed to the general practitioner.

PAIN EXPECTATION AND PROBLEMS RELATED TO SURGERY

Pain originates from four sites:

- skin: pain in the incision area, perceived as a burn
- muscles, peritoneum and supporting structures: somatic, deep, localized, pungent pain, increased with movement
- viscera: dull, diffused and cramping pain, attenuated at rest and associated with signs of high sympathetic tone, tachycardia, nausea and vomiting, anxiety, pallor
- low-back pain: due to the positioning on the operating table, particularly exacerbated in lumbar-sciatic patients.

Table 1 summarises expectation for pain in the different kinds of surgery and specific problems related to surgery that should be taken into account.

CHOICE OF ANALGESIC DRUGS AND TECHNICAL ASPECTS

Postoperative pain is scarcely controlled using only one single drug. In case of intense to severe pain, a multi-modal approach is required [18-20]. The association of different drugs, that allows better results with lower doses of the single drugs, is a basic principle for an effective pain control:

- anti-inflammatory drugs reduce somatic pain caused by surgical trauma and inflammatory reaction
- local anaesthetic drugs block the pain stimuli at both peripheral and central-spinal level
- opioids, which block pain transmission at both spinal and supra-spinal level, are useful in both somatic and visceral pain
- adjuvants reinforce analgesia and lower analgesic drug consumption and their side effects.

TABLE 1. PAIN EXPECTATION AFTER SURGERY AND PROBLEMS RELATED TO SURGERY

| surgery | examples of surgery | problems related to surgery |
|-----------------------------------|--|--|
| Orthopedics | <ul style="list-style-type: none"> • neurolysis • arthroscopy • tenorrhaphy • de Quervain • onycoectomy | <ul style="list-style-type: none"> • pain is also caused by tourniquet • inflammatory phenomena are important • severe pain should be expected after shoulder and knee surgery [12-14]. |
| Gen. surgery | <ul style="list-style-type: none"> • hemorrhoids, anal fistula • hernia repair • quadrantectomy • varicose veins stripping • pyloridal cyst | <ul style="list-style-type: none"> • pain intensity strongly varies with operation site, being severe after upper abdomen surgery, moderate to severe after low abdomen and pelvis surgery |
| Obstetric & Gynecological surgery | <ul style="list-style-type: none"> • D&C • diagnostic or operative hysteroscopy • pick-up • FIVET • laparoscopy | <ul style="list-style-type: none"> • pain is visceral, originates by spontaneous and drug induced uterine contractions and is frequently associated with PONV. • anti-emetic prophylaxis is indicated [15] • effective PONV prevention and treatment should include [16,17] anti 5-HT₃ drugs, nitrous oxide avoidance and postoperative oxygen administration, metoclopramide 10mg, droperidol 0,5-0,75 mg, dexametazone 4mg pre-op., use of propofol, adequate hydration (25ml/kg), adequate pain treatment |
| ENT | <ul style="list-style-type: none"> • myringotomy • tympanoplasty • rhino-septum plastics • FESS | <ul style="list-style-type: none"> • some operations are painful • PONV and bleeding are frequent • LA infiltration, paracetamol-codeine or paracetamol-tramadol are always indicated |
| Ocular surgery | <ul style="list-style-type: none"> • cataract • trabulectomy • calazion • strabismus | <ul style="list-style-type: none"> • in minor operations as cataract, expected pain is low, NSAID's are usually effective • correction of strabismus requires PONV prophylaxis |
| Oral and dental surgery | <ul style="list-style-type: none"> • teeth extraction • implants • orthodontics | <ul style="list-style-type: none"> • pain and bleeding are common • pain is due to inflammatory reaction to surgery • local anesthetics, NSAIDs and rescue tramadol or codeine are effective |
| Urology | <ul style="list-style-type: none"> • bladder and prostate biopsy • TURP • lithotrixy • varicocele • circumcision • hypospadi | <ul style="list-style-type: none"> • penile block with long acting local anesthetics is indicated in penis surgery, associated with ilio-inguinal nerve block • NSAIDs and minor opioids are usually used |
| Plastic surgery | <ul style="list-style-type: none"> • blepharoplasty • mastoplasty • liposuction | <ul style="list-style-type: none"> • pre-incisional local anesthetics infiltration is useful for pain control • NSAIDs should be avoided, due to the risk of postoperative bleeding |

DRUGS

NSAIDs

NSAIDs decrease central and peripheral prostaglandin production, giving relief in mild to moderate pain when associated with weak opioids (tramadol, codeine) and diminishing major opioid consumption of 30-40% in the other cases [19, 20].

Contra-indications (gastric pathologies that require systematic gastric protection, coagulopathies, hypersensitivity to NSAIDs, simultaneous use of other drugs affecting haemostasis, bronchial asthma, renal failure) should be carefully respected.

Maximum allowed dosage and 5 days of continuous administration time should not be exceeded.

Paracetamol inhibits prostaglandin release in the spinal cord and influences serotonergic spinal inhibition of pain. It can be administered both orally and rectally. Results are strictly dose-dependant and 1g every 6 hours at least is needed in adult patients. When used as the only drug, the suggested dose is 4g every 4 hours; if hepatic failure coexists, the maximum dose is 4g/24 hours.

Rectal absorption is slow and variable; the adult starting dose should be 2g, followed by 1g every 6 hours. When associated with NSAIDs, analgesia is improved and prolonged.

COX-2 Inhibitors

COX-2 inhibitors have been introduced to reduce NSAID side effects, still maintaining its activity. They reduce pain and inflammation without affecting platelet activity and with only a few gastrointestinal side effects.

Celecoxib and rofecoxib (only orally administrated) seem to be as effective as NSAIDs in suppressing inflammation, but fewer gastric lesions in subjects previously undamaged are demonstrated after their use. Parecoxib can be administered both i.m. and i.v.: data on its effectiveness suggest that it can be used successfully in postoperative pain.

Tramadol

Tramadol is a centrally acting analgesic drug, active on m receptors and on serotonin and nor-adrenaline re-uptake. In patients with creatinine clearance <30ml/min, the dosage of 200mg/day should not be exceeded; in hepatic failure, the maximum dose per day is 100mg.

Nausea and vomiting can be reduced avoiding high plasmatic peaks that follow administration by boluses, using continuous perfusion systems and administering the priming dose in not less than 30 min.

Local anesthetics

In comparison with previous drugs, ropivacaine and levo-bupivacaine are less neurotoxic and cardiotoxic and produce a concentration-dependent, selective, motor and sensitive block.

Adjuvants

Clonidine may be used at the dose of 1mcg/kg, generally associated with local anesthetics and opioids.

INTRA-OPERATIVE ANALGESIA

During general anesthesia, the use of NSAIDs, COX-2 inhibitors and also major opioids is suggested, but postoperative queue-effects should be avoided.

Selective subdural anaesthesia with normo-/hyperbaric solutions is allowed; fentanyl can be used not exceeding 25mcg (sufentanil: 5-10 mcg); morphine is unadvised because side effects may last 24 hours; clonidine is unadvised given the risk of orthostatic hypotension.

Epidural anaesthesia should be performed only as a single shot, using local anaesthetics and avoiding morphine or clonidine.

Peripheral nerve blocks and wound infiltration with local anaesthetics are simple and effective. Nerve blocks reduce intra and postoperative analgesic administration, recovery times and PONV. Clonidine can be used to prolong the duration of anaesthesia.

POSTOPERATIVE ANALGESIA

Pain entity should be evaluated by VAS in PACU, and treated till it is under control. Weak and major rapid half-life opioids should be administered, PONV should be treated.

Home prescription should comprise:

- paracetamol at full dosage (at scheduled times)
- NSAIDs or selective COX-2 inhibitors at full dosage and at scheduled times
- weak opioids at individually tailored doses (weight, general conditions) when VAS>5.

Oral route should be always preferred.

USE OF CONTINUOUS PERINEUROUS INFUSION CATHETERS

In order to control middle to severe pain, continuous local anaesthetic infiltration through perineurosis catheters can be utilised both intra and postoperatively (see Table 2).

TABLE 2. CONTINUOUS OR PATIENT-CONTROLLED PERINEUROUS INFUSION OF LOW CONCENTRATION LOCAL ANAESTHETICS

| surgery | catheter positioning seat |
|--|---|
| hand surgery | continuous axillary brachial plexus block wound infiltration |
| shoulder surgery | continuous interscalenic brachial plexus block sub-acromial intra-articular |
| foot surgery | continuous sciatic nerve block |
| breast surgery (mastoplasty, mastectomy) | wound infiltration |
| hernia repair | wound infiltration (sub-cutaneous, sub-fascial) |
| maxillo-facial surgery | supra-periosteal |
| gynecological obstetric surgery | wound infiltration |

POSSIBLE PROBLEMS AT DISCHARGE AND THEIR SOLUTION

Table 3 summarises the various problems that can occur at discharge after the positioning of peripheral nervous catheters.

TABLE 3. POSSIBLE PROBLEMS AT DISCHARGE AND THEIR SOLUTION

| problem | what to do | evaluation | discharge criteria |
|--|--|--|---|
| risk of damage by positioning + motor block | check anatomical anomalies that could influence positioning give correct posture rest and lift limbs by appropriate bearing look for signs that could evoke positional damage | skin: intact, no reddening | absence of any sign or symptom related to positional damage |
| risk of hypo-perfusion due to circulatory flow compression | check basal conditions of perfusion evaluate postoperative tissue perfusion | vital signs are stable peripheral oxygen saturation remains in range of normality | tissue and surgical incision are normally perfused |
| lacking/imprecise information | give clear information on: symptoms related to block and its duration care of the surgical site/cast care needed at home sensitivity restoration consider home access problems (stairs, etc.) | evaluate patient's comprehension of the problems | patient shows adequate comprehension |

EXAMPLES OF INFORMATION FORM

Instructions at discharge after single shot or continuous peripheral nerve blocks should encompass many different aspects, as illustrated in the following examples.

Upper limb:

- * your shoulder, arm or hand subjected to surgery will remain insensible and weak for a while after operation
- * moving your arm could be impossible while the local anaesthetic action is still lasting
- * take care of the arm position and the elbow above all; keep your arm resting on two pillows, maintain cast positioned, when both awake and sleeping
- * keep your arm far from sources of heat or cold: your sensitivity to warm or cold may be insufficient till the end of duration of local anesthetic drugs
- * the anaesthesia effect may last 12-24 hours; take the prescribed analgesic drugs at the suggested time or just before sleeping, that is before pain resumption or anaesthesia regression
- * take the prescribed analgesic drugs at the suggested time, even though you don't feel pain
- * sensitivity and motor block will last for some time where an elastomeric pump has been positioned before discharge

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- * a responsible adult person should stay with you and help you after the operation; remember that you won't use your arm in eating or dressing/washing yourself
 - * a sensation of anaesthetised skin at one side of your face, closed nose, hoarse voice or red eye could be present while the anaesthesia effect lasts
 - * due to an extension of anaesthesia to the diaphragm, slight difficulty in taking a deep breath could also be present while the anaesthesia effect lasts: lying and sleeping with your head and trunk inclined at 45° (i.e.: leaning on 2 or 3 pillows) will help you feel better; every discomfort will cease at the end of anaesthesia
 - * call this telephone number if you have any question to ask
 - * call this telephone number in case of cough or chest pain, or in case you are not able to breath when in a sitting position: this could be due to a severe emergency condition, completely different from anaesthesia residual effects.

Lower limb

- * your operated leg could remain anaesthetised after operation
- * you will have to use crutches to walk, because your leg could fail
- * avoid leaning your weight on the operated leg till the end of anaesthesia effect and/or for 24 hours, except in case of your surgeon's different advice
- * keep your leg far from hot or cold sources: your sensitivity to warmth or coldness may be insufficient till the end of duration of local anesthetic drugs
- * anaesthesia effect may last 12-24 hours; take the prescribed analgesic drugs at the suggested time or just before sleeping, that is before pain resumption or anaesthesia regression
- * take the prescribed analgesic drugs at the suggested time, even when you don't feel pain
- * sensitivity and motor block will last for some time where an elastomeric pump has been positioned before discharge
- * a responsible adult person should stay with you and help you after the operation; remember that you will have to use crutches or a cast to walk; ask your surgeon or GP for instructions on how to walk
- * keep your leg leaning on a pillow; use ice to diminish swelling and pain: put ice into a plastic bag and arrange it compactly before positioning it on the site of pain; avoid direct contact with the ice, which could damage your skin
- * be careful when climbing or descending stairs; discuss any difficult access to your home with your surgeon or GP
- * do not drive while your leg remains anaesthetised, or till your surgeon gives you permission
- * call this telephone number in case you have any question to ask
- * call this telephone number in case of severe headache; go to the nearest emergency ward in case of cough or chest pain, or in case you are not able to breathe when in a sitting position: this could be due to a severe emergency condition, completely different from anaesthesia residual effects.

ORGANISATIONAL ASPECTS

Organization is a key concept in ambulatory surgery and this should be applied to the whole process. Possible problems should be anticipated and adequate solutions pre-arranged.

Consequently:

- * characteristics of expected pain should be known and quantified in advance
- * pain score and patients should be regularly evaluated till discharge
- * treatment protocols should be defined, in accordance with the case-mix of the facility
- * pain evaluation analogue scales should be adopted
- * patient information should be complete, in order to facilitate adherence to the prescribed treatment and to allow pain measurement and monitoring
- * registration forms or data recording systems should be adopted
- * analgesic drugs should be readily available
- * an emergency treatment should be planned
- * patient-facility communication should be warranted at all times
- * the GP should be properly involved.

QUALITY AND CONTINUOUS QUALITY IMPROVEMENT

Periodical audit of the results should be performed on the base of registered pain scores, reports on side effects and/or complications.

Pain control should be included in every customer satisfaction evaluation process, and considered a basic requirement for the facility's quality evaluation.

REMINDER ABC

- * **Assessment:** systematically evaluate pain, considering it as the fifth vital sign
- * **Balanced analgesia:** prefer multi-modal analgesia techniques, combine opioids, non opioids, and loco-regional anaesthesia techniques
- * **Continuous audit:** constantly evaluate patient satisfaction on pain treatment
- * **Discharge:** at discharge, give the patient written instructions on home treatment and rescue medication for pain control
- * **Education:** continuous education on pain treatment for anaesthetists, surgeons and nurses operating in ambulatory surgery.

REFERENCES

1. Commissione SIAARTI Anesthesia in Day Surgery. Raccomandazioni clinico-organizzative per l'anestesia in day surgery. *Minerva Anesthesiol* 2000; **66**: 915-26
2. Commissione Bioetica SIAARTI. La dichiarazione di avvenuta informazione e consenso all'anestesia. *Minerva Anesthesiol* 2000; **66**: 565-9
3. Savoia G, Ambrosio F, Paoletti F et al. SIAARTI recommendations for the treatment of postoperative pain. *Minerva Anesthesiol* 2002; **68**: 735-50
4. Rawal N. Analgesia for day case surgery. *Br J Anaesth* 2001; **87**: 73-87
5. Chung F, Ritchie E, Su J. Postoperative pain and its relief. *Anaesthesia* 1997; **52**: 438-42
6. Pavlin DJ, Rapp SE, Polissar L. Factors affecting discharge in adult outpatients. *Anesth Analg* 1998; **87**: 896-902
7. Chung F. Recovery pattern and home readiness after ambulatory surgery. *Can J Anaesth* 1996; **43**: 1121-7
8. Carpenter R. Consensus Statement on acute Pain Management. *Reg Anesth* 1996; **21**: 152-6
9. De Jong. Postoperative Pain Treatment In Ambulatory Surgery, Proceedings of the 5th International Association on Ambulatory Surgery Congress, Boston, May 8th-11th, 2003, page 315-9.
10. Harrop-Griffiths W. Continuous regional analgesia can we afford not to use it? *Anaesthesia* 2001; **56**: 299-301
11. UEMS-European Board of Anaesthesiology (EBA). Training guidelines in anaesthesia of the European Board of Anaesthesiology Reanimation and Intensive Care. *EJA* 2001; **18**: 563-71 <http://www.uems.be>
12. Horn E, Schroeder F, Wilhelm S. Wound infiltration and drainage lavage with ropivacaine after major shoulder surgery. *Anesth Analg* 1999; **89**: 1461-6
13. Reuben S, Sklar J. Pain Management in Patient who undergo outpatient arthroscopic surgery of knee. *Bone and joint Surgery* 2000; **82**: 1755-66
14. Rasmussen S, Larssen A, Thomsen ST. Intra-articular glucocorticoid bupivacaine and morphine reduces pain inflammatory response and convalescence after arthroscopic meniscectomy. *Pain* 1998; **78**: 131-4
15. Joshi W, Reuben S, Kilaru J. Postoperative analgesia for outpatient arthroscopic knee surgery with intra-articular clonidine and morphine. *Anesth Analg* 2000; **90**: 1012-6
16. Tramér MR. Systematic reviews in PONV therapy. In: *Evidenced based resource in anaesthesia and analgesia*. BMJ Books 2000; **8**: 157-78
17. Leslie JB. How can we best prevent or treat postoperative nausea and vomiting? *Current opinion in Anaesthesiology* 2001; **14**: 623-7
18. Bisgaard T, Klarkov B, Rosenberg J, Kehlet H. Characteristic and prediction of early pain after laparoscopic cholecystectomy. *Pain* 2001; **90**: 261-9
19. Creaws J. Multimodal pain management strategies for office based ambulatory procedures. *JAMA* 2002; **5**: 288.
20. Kehlet H, Dahl JB. The value of multimodal or balanced analgesia in postoperative pain treatment. *Anesth Analg* 1993; **77**: 1048-56