analiza zilnică al statutului gazelor sangvine, la intervale de 3 ore, ar veni spre completarea criteriilor de diagnosticare precoce a complicaţiilor septice la pacienţii critici chirurgicali.

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THE EFFECT OF STANDARDIZED POSTOPERATIVE ANALGESIA ON PAIN LEVELS IN PATIENTS AFTER ORTHOPEDIC SURGERY

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Abstract

We evaluated the effect of standardized postoperative analgesia on pain levels in patients after orthopedic surgery on femur and its joints in ICU. In our study, 61 patients were divided in 2 groups after an orthopedic surgery on femur and its joints, admitted to ICU for more than 15hours were included. First group (n=36) was prescribed analgesia by ICU doctors judging by their own experience. The second group (n=25) received a standardized postoperative analgesia according to pain scores. Average scores in all measurement times were significantly lower in intervention group compared with control group, besides the time of admission (P<0,01). Implementation of the pain management protocol significantly reduces the overall occurrence of unacceptable pain in patients after orthopedic surgery.

Rezumat

Efectul analgeziei postoperative standardizate asupra nivelului dureros la pacienţii supuşi intervenţiilor chirurgicale ortopedice

A fost evaluat impactul standardizării analgeziei asupra nivelului dureros al pacienţilor în perioada postoperatorie. În studiu au fost incluşi 61 de pacienţi divizaţi în două grupuri care erau programaţi pentru intervenţii chirurgicale a femurului sau ale articulaţiilor acestuia, internaţi în UTI mai mult de 15 ore. Primul grup de pacienţi (n=36) a primit o analgeziei conform practicii curente, la al doilea grup (n=24)a fost palicată analgezie postoperatorie standardizată Media scorurilor dureroase la toate orele de evidenţă, cu excepţia orei zero, a fost semnificativ mai joase la grupul de pacienţi supuşi protocolului de analgezie standardizată, comparativ cu grupul nesupus protocolului (P<0,01).Utilizarea unui protocol standardizat al analgeziei în perioada postoperatorie are un impact pozitiv asupra controlului durerii postoperatorii la pacienţii supuşi unei intervenţii ortopedice.

Introduction

The presence of pain is a common phenomenon among patients in critical care units. Most patients report that their pain was inadequately assessed and managed during their stay in the

intensive care unit (ICU)[17]. Inadequate pain control is inarguably a problem that represents a major stress experience during a patient's ICU stay[18]. In the presence of life-threatening illness or injury, however, pain assessment and management are often overlooked or underappreciated by the health care team.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) implemented pain management standards in 2001 that recognized patients' rights to appropriate assessment and management of pain. In the JCAHO guidelines, examples of implementation include the addition of pain as the 'fifth' vital sign to be noted in the context of initial assessment; the use of pain intensity ratings; and posting of a statement on pain management in all patient care areas[7].

However, despite numerous regulatory initiatives and evolving advanced methods, postoperative pain remains a major challenge for many hospitals. Detailed information about patient's assessments of pain and whether standards of pain management are being met are important factors to consider when identifying potential areas for improvement[14].

The current study was conducted to evaluate the effect of standardization of postoperative analgesia on pain levels in patients after orthopedic surgery on femur and its joints in ICU.

Materials and methods

The two phase of prospective controlled study was performed in ICU of National Scientific Practical Center of Emergency Medicine, Chisinau. The Medical Ethical Committee of the hospital approved the study protocol and waived the need for informed consent.

All patients after an orthopedic surgery on femur and its joints, admitted to ICU for more than 15h in the period of mid of November 2010 and mid of February 2011 were included. Patients who were under 18 years, severe encephalopathy, patients unable to speak, and immediate postoperative complications during the stay ICU were excluded from the study. Demographic data and both prescribed and administered analgesics were obtained from the medical records.

The visual analog scale (VAS) was chosen as the scoring system[4]. The VAS is a 100-mm ruler with a movable cursor. At the left side is written 'no pain' and at the right side is written 'worst possible pain'. The patient marks the intensity of pain[2]. Visual Analog Scale (VAS) is easy to use and have been utilized widely by the investigators to quantify acute pain in postoperative period[8]. Moreover the reliability and reproducibility of the VAS have been studied extensively[1,19]. The VAS has a maximal acceptable pain score of 39 mm. Pain scores were recorded during the stay in the ICU.

During the control phase, pain was neither systematically evaluated nor registered. Following the surgery at ICU admittance, analgesia besides the continuous epidural analgesia and a non-steroid anti-inflammatory drug in most of the cases, the intensive care doctors could prescribe analgesia judging on their own experience. An independent researcher measured pain at admittance in ICU, at 3h, 6h, 12 h and discharge from ICU.

Following the control phase the pain management program was introduced. Patients were given before the surgery an informative brochure about anesthesia and postoperative pain treatment. Nurses were trained in assessing pain, and were introduced specific analgesics protocol.

The intervention group of patients was administered preemptive analgesia with dexketoprophen and intraoperative ketamine. The pain score was assessed by nurses at ICU admittance, at 3h, 6h, 12 h, and discharge from ICU, also on patients demand. Besides an epidural continuous analgesia and 3 times a day intravenous dexketoprophen, if pain score were more than 40 mm was followed by an administration of 3 mg intravenous morphine.

Data were analyzed using Microsoft Excel 2003 software. A *P* value of less than 0,05 was considered to be statistically significant.

Results

Table 1 shows patients characteristics of the control group (n=36) and the intervention group (n=25). There were no significant differences between the groups.

We classified pain score in 'no pain' (VAS=0mm), 'mild pain' (VAS=1-39mm), 'moderate pain' (VAS=40-69mm), and 'severe pain' (VAS=70-100mm).

Table 1 Baseline characteristics of two groups of patients

Baseline characteristics		Group 1 (n=36)	Group 2 (n=25)	***P***	t-stud
Sex	Male	17(47,22%)	13(52,0%)	>0,05	0,36
	Female	19(52,78%)	12(48%)	>0,05	0,36
Age (mean±S.Err.)		60,39±1.85	56,32±1,82	>0,05	1,56
Anesthesia risk	ASA II	33(91,67%)	23(92%)	>0,05	0,05
	ASA III	3(8,33%)	2(8%)	>0,05	0,04
Surgery	Hip arthoplasty	23(63,89%)	16(64%)	>0,05	0,008
	Osteosynthesis	7(19.44%)	6(24%)	>0,05	0,42
	Knee arthroplasty	6(16,67%)	3(12%)	>0,05	0,51
Anesthesia	EA+RA	34(94,44%)	24(96%)	>0,05	0,28
	RA	2(5,56%)	1(4%)	>0,05	0,28
Surgery duration (min)		100,83±6,67	115±8,95	>0,05	1,30
Anesthesia duration (min)		177,91±8,01	162,6±9,45	>0,05	1,23
ICU stay period (h)		18,94±0,38	18,56±0,44	>0,05	0,65

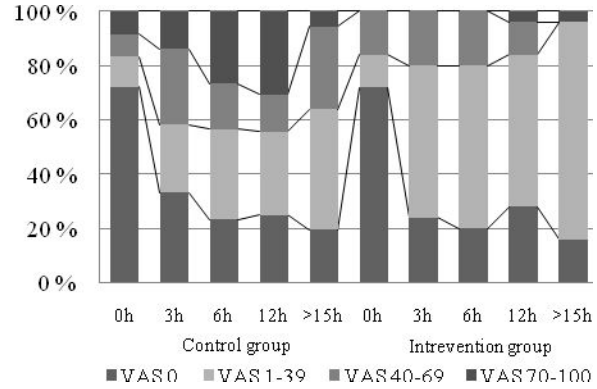
EA, epidural anesthesia; RA, spinal anesthesia.

All pain scores were scored by patients themselves are evaluated here. Unacceptable pain events (VAS>40mm) occurred in 33,33% (60 of 180 pain scores) of all measurements in the intervention group and in 15,2% (19 of 125 pain scores) in the control group (Fig. 1) during the stay in ICU. Unacceptable pain were significantly reduced in intervention group compared with control group (P<0.05).

The percentage of patients who developed 'mild pain' was significant different between the groups for intervention group at 3h, 6h, 12h and ICU discharge (P<0,05→ P<0,01), and 'severe pain' for control group at 3h, 6h, 21h (P<0,05→P<0,01).

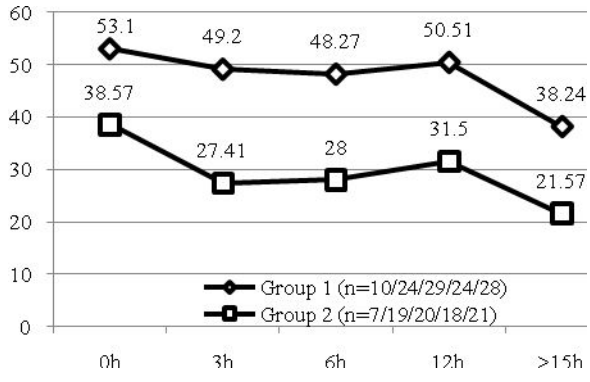
Figure 2 represents the average scores for both groups during stay period in ICU. Average scores in all measurement times were significantly lower in intervention group compared with control group, besides the time of admission (P<0,01→P<0,001). Furthermore, the decrease rate of mean pain score in control group is 28%, compared with intervention group which is 44%.

Figure 1



Patients self-reports during stay in ICU

Fig. 2



Average pain score during stay period in ICU

ICU patients in the control group received seven types of analgesic, compared with intervention group which received 3 types of analgesics (table 2). The use of morphine was

significantly higher in control group than in intervention group (mean 10,14±0,76mg vs. 6,31±1,48mg, $P<0.05$), but more patients in intervention group were received morphine than in control group (76% vs. 38.89%). The control group was received trimeperidine and tramadol beside morphine.

Discussion

The study of Beauregard et al.[2], in which postoperative acute pain is analyzed during the first week after surgery, demonstrates that 40% of patients suffer moderate or intense pain in the first 24-48 hours. A different pattern is observed in the duration of pain in relation to the type of surgery. Chung et al.[6] , in a study of 10,008 patients, observed that up to 25% of patients present moderate-to-intense pain in the first 24 hours after discharge, and that orthopedic surgery, especially shoulder surgery, was associated with the most severe pain. Because of the strong impact of the type of surgical intervention on the expected pain, the proposal should be to manage pain in relation to the type of surgery performed[11]. We could state that a significant number of patients experience pain in postoperative period. We focused our study in particular on patients in the ICU after orthopedic surgery on femur and its joints and observed that more than 40% of patients experienced moderate to severe pain in postoperative period (control group).

Consequences of uncontrolled pain can lead to myocardial ischemia and infarctions, pulmonary infections, paralytic ileus, urinary retention, thromboembolisms, impaired immune functions. The presence of postoperative acute pain aggravates functional deterioration and limits daily activities, mobilization and the capacity to participate in postoperative rehabilitation, delaying the return to the work. Other appreciable effects are discomfort, effects on sleeping habits, and contribution to the development of chronic pain[15].

Table 2 Usage of analgesics in postoperative period in ICU

	Control group (*n*=36)	Intervention group (*n*=36)
Lidocaine continous(epidural), mg	1243.22±76.4 (86,11%)	1205.21±62.07 (92%)
Bupivacaine intermittent(epidural), mg	62.5±17.8 (33,33%)	-
Morphine iv/im, mg	10.14±0.76 (38,89%)	6.31±1.48 (76%)
Trimeperidine im, mg	21.53±1.53 (36,11%)	-
Tramadol im, mg	100 (16,67%)	-
Ketorolak im, mg	75.48±4.37 (86,11%)	-
Dexketoprofen iv, mg	75±25 (5,56%)	150 (100%)

iv, intravenous; im, intramuscular.

Pain therapy is an important aspect of medical practice for patients of all ages, to optimize care, to obtain an adequate quality of life and to improve their general conditions. The success of postoperative pain therapy depends on the ability of the clinician to assess the presenting problems, identify and evaluate pain syndromes and formulate a plan for comprehensive continuing care[5].

In the pursuit of improved pain management of ICU patients, reliable assessment of pain severity is essential. A major barrier to the assessment and even application of assessment tools is the challenge of acceptance and consistent use of new tools[20]. This study was not designed to validate the tool or to evaluate the impact of the tool on pain outcomes. But we have faced the need to train nurses in correct assessment of pain, which were essential in implementation of a standardized analgesia protocol. Gordon et al stated that education to support nurses with knowledge should be included in the hospitals' quality improvement programs[9].

It has been suggested that the key issue of postoperative pain management strategies is to 'make the pain visible'. Postoperative pain assessment and management should be documented routinely in a systematic format. It can be documented as part of the vital signs record form[16].

Use of analgesic techniques and protocols allow a complete control of postoperative pain[3]. The reasons for this under treatment include lack of knowledge related to basic principles of pharmacokinetics and pharmacodynamics of opioids; conservative use of opioids based on unfounded beliefs that opioids can lead to addiction, tolerance, or adverse effects that will lengthen hospital stay; inappropriate interpretation of pain as anxiety or agitation; and lack of appropriate, validated pain assessment tools for nonverbal, sedated patients[18,20]. In our study we have shown that although more patients were received morphine in interventional group, the mean dose of morphine was significantly lower compared with the control group. Furthermore a third of patients in control group were received another minor opioid analgesic.

Klopfenstein et al[12] considered the reasons for poor postoperative pain management as insufficient education, training of staff and patients and lack of communication between them. There were also divergent attitudes, absence of systematic recordings, pain assessment done only at rest, and lack of public awareness. Our study not underlines only the finding of impact of protocolisation of analgesics use in postoperative period, but also the importance of systematic assessment and documentation of pain during the ICU stay.

Adequate control of postoperative pain following hip and knee arthroplasty can be a challenging task. Patients receiving the Mayo Clinic Total Joint Regional Anesthesia Protocol have significantly improved analgesia with fewer side-effects when compared with control patients[13]. The intervention phase of our study showed reduced pain levels, with more that 20% for moderate and severe pain compared with control group. Also the mean pain score were significantly lower in intervention group, below the unacceptable pain score (VAS<40mm).

Conclusions

We concluded that implementation of the pain management protocol significantly reduce the overall occurrence of unacceptable pain. Moreover, the mean score during ICU stay were significantly lower in interventional group compared with the control group. The decrease rate of mean pain score in control group is 28%, compared with intervention group which is 44%.

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EFECTELE ADVERSE ALE HEMOTRANSFUZIEI

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Summary

Transfusion adverse reactions

Blood replacement therapy is generally safe, but certain risks accompany the transfusion of blood and plasma components. Immediate adverse reactions are: acute haemolytic reactions, febrile nonhemolytic reactions, allergic and anaphylactic reactions, transfusion-related acute lung injury, volume overload, hypothermia, citrate toxicity, hyperkalemia, bacterial contamination. Delayed adverse reactions are: delayed haemolysis, immunosuppresion, graft versus host disease, post-transfusion purpura, iron oveload, infectious disease transmission.

Rezumat

Hemotransfuziile sunt în general bine tolerate, totuşi există riscurile apariţiei unor reacţii adverse. Efectele adverse imediate sunt: reacţiile hemolitice şi cele febrile nonhemolitice, reacţii alergice şi reacţii anafilactice, leziune pulmonară acută legată de transfuzie, supraîncărcarea circulatorie, complicaţiile metabolice, hemoliza non-imună, contaminarea bacteriană, iar cele tardive - reacţii hemolitice întârziate, imunosupresia, boala grefă contra gazdă, purpura posttransfuzională, supraîncărcarea cu fier, transmiterea de boli infecţioase.

Hemotransfuziile sunt în general bine tolerate, totuşi există riscurile apariţiei unor reacţii adverse. Ele se clasifică după timpul apariţiei (acute şi tardive) şi mecanism (imune şi nonimune).

Reacţiile acute apar în timpul sau în primele ore după transfuzie, iar cele tardive - la zile, săptămâni sau chiar ani după transfuzie. Reacţiile mediate imun apar din cauza prezenţei de