

MEETING ABSTRACTS



Abstracts of the 7th edition of “National Congress of the Romanian Association of Regional Anesthesia and Pain Therapy (ARAR)”

Organizing Committee of ARAR 2023^{1,*}

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The annual meeting of the Romanian chapter of the European Society of Regional Anesthesia and Pain Therapy (ESRA) reached to the seventh edition. More information is available at arar.medevents.ro. The meeting was held in Cluj-Napoca, and gathered together 65 lecturers from 15 countries. 430 delegates registered for the meeting for both on-site and on-line versions. The participants had the opportunity to present the results of their own scientific work in the dedicated posted sessions. The organizing committee hopes that soon this session will become a launching pad for the young researchers who will increase their numbers in studying both regional anesthesia and pain treatment. The collaboration with Signa-Vitae journal honor us, and we hope we will increase it with mutual benefits. Below are some of the nominated abstracts and lectures.

The 7th edition of “National Congress of the Romanian Association of Regional Anesthesia and Pain Therapy (ARAR) Abstract/Lecture Reviewers

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01. Myofascial blocks as a method of analgesia and prevention of chronic postsurgical pain in children

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Objectives: Chronic postsurgical pain (CPSP) is defined as pain that develops or increases in intensity after a surgical procedure and persists for at least three months. The reported prevalence of CPSP varies between 5% to 54%. In pediatrics, regional anesthesia (RA) is one of the most valuable and safest means of perioperative pain management and chronic pain prevention. The anterolateral and the posterolateral trunk blocks, as novel RA techniques, are quite promising today; this is due to the dynamic development of ultrasound navigation in intensive care, especially in pediatrics. Ultrasound-guided quadratus lumborum block (QLB) is one of the interfascial plane blocks used for pain relief in abdominal surgeries in children and adults. The transversalis fascia plane block (TFPB) is used during surgeries on inguinal hernia, trephine biopsy of the iliac spine, chronic neuropathic pain in adults. However, the reports on its routine use in pediatric practice are scarce. The advantages of RA include accelerated recovery of children, reduction in the frequency of opioid consumption, postoperative nausea and vomiting, the intensity of postoperative pain, the frequency of respiratory complications, and the costs of the health care system.

Materials: The study included 60 (25 girls, 35 boys) children at the age of 7–18 years, ASA grades I–II, who underwent anterior abdominal wall surgery, with the mandatory parental consent to involve their child in clinical research. All children were divided into two groups: Group I included 30 children who were operated on under general anesthesia using the TFPB combined with the QLB-4 *via* a single injection; Group II comprised 30 children who were operated on under general anesthesia using opioids.

Results: The prevalence of chronic pain syndrome in children of Group I and Group II was found to be $9.24 \pm 0.35\%$ and $19.81 \pm 0.21\%$, respectively; the length of hospital stay in children of Group I was 2.1 ± 0.16 days vs. 3.28 ± 0.24 days in children of Group II ($p < 0.05$). While staying in the surgical department, children of Group I had significantly lower FLACC and VAS (FLACC: 1st day -4.7 ± 0.17 , 2nd day -3.91 ± 0.28 , 3rd day -3.22 ± 0.22 ; VAS: 1st day -4.76 ± 0.28 , 2nd day -3.58 ± 0.28 , 3rd day -3.2 ± 0.36) scores as compared to those in Group II (FLACC: 1st day $-5.5 \pm 0.22^*$, 2nd day $-4.52 \pm 0.14^*$, 3rd day $-34.0 \pm 0.16^*$; VAS: 1st day $-5.36 \pm 0.18^*$, 2nd day $-4.48 \pm 0.16^*$, 3rd day $-3.95 \pm 0.11^*$) (Notes: $*p < 0.05$ —a significant difference between children in Group II and Group I). The amount of intraoperatively administered fentanyl was the greatest in patients who underwent conventional analgesia (Group II, $p < 0.05$) and constituted 8.8 ± 2.41 mL vs. 4.86 ± 0.33 mL in Group I ($p < 0.05$). Only children who underwent conventional anesthesia required morphine injections. As a component of a multimodal analgesic regimen, paracetamol was intravenously administered, with significantly greater amounts in children of Group II (392 ± 28.53 mL) as compared to those who received combined regional anesthetic block (166.63 ± 20.05 mL, $p < 0.05$).

Conclusions: Chronic pain syndrome in children who underwent anterior abdominal wall surgery is a quite common phenomenon and prevails in the group of conventional anesthesia as compared to children who receive RA. The application of regional analgesia techniques (the QLB + TFPB *via* a single injection) allows for shortening the length of hospital stay, reducing the need for opioid analgesics intra- and postoperatively; providing adequate acute pain control in the postoperative period; reducing the incidence of chronic postsurgical pain in children.

Keywords: Regional analgesia; Chronic postsurgical pain; Children

02. Ultrasound guided genicular nerve cryoablation

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Objectives: We used the ultrasound guided genicular nerve block technique to perform the cryoablation of the genicular nerves using the Metrum Cryo-s Painless machine.

Materials: Using a 1 mm ice-ball cryo probe and 3 minutes freeze/1 min minute defrost/3 minutes freeze cycle, we performed an ultrasound guided genicular nerve ablation for 30 patients suffering from chronic knee pain.

Results: 27 of our patients showed almost no pain instantly after the procedure, for 2 of the patients with a BMI higher than 60, we had to repeat the procedure in order to achieve the targeted results due to the high complexity of the case having very thick knees. One of the patients had instant pain relief, but after two months, the pain came back, at a lower pain score, after a 2-hour flight.

Conclusions: The ultrasound guided cryoablation of the genicular nerves is a safe and quick way of dealing with chronic knee pain, without having to get exposed to radiation.

Keywords: Ultrasound; Genicular nerve block; Cryoablation

03. Awake craniotomy performed under scalp nerve block and continuous dexmedetomidine infusion

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Objectives: We want to present our experience with a number of 10 brain surgeries, for both benign and malignant tumors, which we performed with awake anesthesia done under scalp nerve block and continuous dexmedetomidine infusion. All the surgeries were scheduled and no emergency surgeries were performed.

Materials: We started with the continuous dexmedetomidine infusion on a 1 mcg/kgc infused over 10 minutes dose, afterwards we reduced the dose to 0.2 mcg/kgc/hour and mounted the central venous line and the arterial line. Then we performed the scalp nerve block using a landmark guided technique with a total of 30–40 mL of a solution containing Ropivacaine 0.5% and Lidocaine 0.5%. The dexmedetomidine dose was raised to 1 mcg/kgc/hour during the mounting of the pins of the head rest and throughout the surgery until the dura was opened and the brain exposed.

Afterwards, we lowered the dose to 0.2 mcg/kg until the neurologist in the team was satisfied with the patients response. We had surgeries lasting from 3 hours up to 6 hours. The scalp was efficient in all situations and. The dexmedetomidine dose was kept at 0.2 mcg/kg/hour until the end of the main surgical event, being raised to 1 mcg/kg/hour at the end of the surgery. The dexmedetomidine infusion was lowered and stopped after the patient was admitted in the ICU.

Results: All our surgeries went without incidents and the recovery was fast, the patients being transferred to the ward the second day after the surgery.

Conclusions: The awake craniotomy with scalp nerve block and continuous dexmedetomidine infusion in a safe and comfortable procedure with good outcome and a fast recovery for the patient.

Keywords: Awake craniotomy; Dexmedetomidine; Scalp nerve block

04. Lumbar lateral plexus nerve block and dexmedetomidine infusion in the surgery of the lower limb

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Objectives: We would like make a multiple case report of orthopedic lower limb emergency surgeries performed under lateral lumbar plexus nerve block and procedural sedation with dexmedetomidine.

Materials: We performed an ultrasound guided lateral lumbar plexus nerve block using 30–40 mL of a solution containing Ropivacaine 0.5% and Lidocaine 0.5%, combined with a dexmedetomidine continuous infusion for procedural sedation; in a number of 5 cases of emergency orthopedic lower limb surgeries. The patients had numerous health conditions for which both general and spinal or epidural anesthetics were controversial.

Results: The technique assured optimal surgical comfort and good patient outcome.

Conclusions: This technique proved useful and safe in situations was general, spinal or epidural anesthetics has several controversies.

Keywords: Lateral lumbar plexus nerve block; Dexmedetomidine; Lower limb surgery

05. Diagnostic blocks - basic principles

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Diagnostic blocks are the temporary interruption of stimulus conduction in a nerve or nerve plexus using a low dose of local anesthetics to allow the conduction pathway to be recognized and provide evidence of the cause of pain [1]. Sometimes, they can have another purpose than to provide a diagnosis of the pain generator or the pain pathway. Prognostic blocks allow predictions to be made regarding the potential efficacy of a longer-term nerve block, neurolysis, or surgical sympathectomy [1]. Surgical blocks are usually intended for acute pain or surgery; they are blocks in which injecting a higher dosage and/or a higher volume of local anesthetic is intended to isolate a specific body region [1].

Blocks done with local anesthetic sometimes have therapeutic value. A block can provide pain relief that lasts longer than the duration of the local anesthetic, a phenomenon that we see more frequently in autonomic plexus blocks. There are presumptions in the literature as to why this is happening, but nothing is proved for certain. In 2017, Gunduz OH and Kenis-Coskun O. suggested that the mechanism is the loss of regular inhibitory influence on pain and that adrenergic hypersensitivity is also thought to play a part in the symptoms. In these conditions, a sympathetic block can outlast the pharmacokinetics of the local anesthetic by interrupting the positive feedback circuit [2].

Other times, a therapeutic block works due to hydrodissection of the entrapped nerve. Releasing the nerve that is entrapped by muscles, fascia, tendons, or other tissues by bathing it in a solution at the entrapment site and giving its mobility back will cause that nerve to stop firing signals [3].

Depending on the chosen block and technique, the literature describes different false-positive or false-negative results. In the cervical spine, the reported false-positive rates for uncontrolled medial branch block range from 36% to 55%

based on dual blocks [4]. These effects have to do with anatomic variability, local anesthetic dispersion and systemic absorption, placebo effect, and different techniques. In lower lumbar facet joint diagnostic blocks for chronic pain, the use of a single block has a false-positive rate of 25% to 44% [5].

In 2019, Sayed E Wahezi, Jocelin J Molina *et al.* showed in a cadaveric study that 0.5 cc of solution injected during a cervical medial branch block technique had up to a 2.5 cm dorsal spread, and 0.25 cc of solution had a 1 cm dorsal spread [6]. Doing cervical MBB in a live person might have a bigger spread due to the movement of the muscles and fascia. In this context, the high false-positive values seem plausible.

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06. Is regional anesthesia preferable to general anesthesia?

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The answer to this question is not simple, because not all the patients are the same, they do not pass the same kind of surgery and there is no single one method of general or regional anesthesia.

But data from literature indicate that, in most cases, regional techniques offer better results, intra- and postoperatively. A survey published some years ago including more than 140 trials and 10,000 patients (equally divided in two groups, general and regional anesthesia) showed some clear advantages of the regional techniques: reduction in mortality rate, in the rate of deep vein thrombosis, pulmonary complications, need for blood transfusion and postop pneumonia. Later on, specific studies on anesthesia for hip, vascular, prostate and colonic surgery presented similar results, of clear better results when using regional and not general techniques.

These results can be easily explained by the fact that regional anesthesia blocks the surgical stress response by inhibition of the nociceptive signal from the surgical area.

Besides, regional anesthesia, and especially that which uses continuous drug administration through catheters, solves the problems of postop pain and PONV (postop nausea and vomits), two main complains in the immediate period after surgery.

One result less expected is the lack of difference between the two techniques on the postop cognitive function, regional anesthesia not being accompanied (as could be expected) by a reduction in the rate of postop delirium.

Finally, some studies indicate the fact that the recurrence of metastasis is significantly delayed after regional anesthesia, in comparison with general techniques.

How can we summarize this topic? Here are some important points:

1. regional anesthesia reduces the stress response to surgery, among them pituitary and adrenal hormones hypersecretion and hyperactivation of the sympathetic nervous system;
2. longer the effect of neural block, more significant is the influence on the stress response to surgery;
3. continuation of regional postop administration of anesthetic drugs contributes to patient satisfaction, early ambulation and positive nitrogen balance;
4. some data indicate the preventive effect of regional techniques regarding the recurrence of tumors and metastasis after surgery.

But, in the same time, one cannot overemphasize the importance of what JH Silverstein wrote almost 25 years ago: “Anesthesia is not safe in itself. It is our presence that makes anesthesia safe for the patient”.

07. The medico-legal aspects of positioning on the operating table

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Background: As in any other medical field, the practical equation regarding the legal danger is the delivery of standard of care vs professional negligence.

When this equation is disrupted, the result is malpractice, *e.g.*, negligence committed within professional activity.

The reality of our days obliges every practitioner to be aware of this danger and to act, every single day, in order to avoid complains.

Nevertheless, the number of malpractice cases increases every year, and the last data show a record of 17,000 new medicolegal files in the USA, and almost 2000 in Israel.

Anesthesiology is among the five first medical specialties implicated in malpractice claims (5.7% of all malpractice claims in 2019 in the USA).

The reasons for this situation reside in some characteristics of our profession, among them: the fact that anesthesia is a “temporary pharmacological intoxication”, the very little interaction with patient and family, but especially the danger of human error, which in anesthesia would jeopardize the patient’s life. Besides, the anesthesiologist works in a team, and the lawyers are prone to name all the team members involved in a failed case.

The topic of possible nerve injury because of malpositioning on the operating table is still debatable. Nerve injuries during anesthesia account for some 15% of anesthetic malpractice claims, and improper position on the operating table may cause injury, but in a large proportion of cases the mechanism of injury is not clear.

What seems to be clear is the fact that the responsibility for correct positioning lies with every member of the OR team.

The Case: The female patient, 46-year-old, was diagnosed as having an acute abdomen which necessitated immediate surgical intervention. Emergent appendectomy—one hour and a half duration—was performed under general anesthesia. During anesthesia and surgery both arms have been extended on 90°, blood pressure cuff was placed on the right arm, and a vertical metallic bar was used on anesthesia screen.

When the patient woke up after anesthesia she complained of weakness of the right arm. Neurological examination, as well as EMG and neck CT confirmed the diagnosis of right radial palsy. Physiotherapy followed by a surgical intervention for radial nerve repair failed to improve the condition, and an invalidity of 68% was decided upon by a special committee, one year after the initial surgery.

The plaintiff’s lawyer brought the case in court, accusing the OR team of negligence. He presented some data from the literature, which incriminated both the blood pressure cuff and the vertical bar as possible responsible for the radial nerve injury:

*accidental prolonged inflation of the blood pressure cuff;

*the movement of the vertical bar, because of frequent changing position of the surgeon, with pressure on the arm.

The defendant’s expert, while accepting the clear connection between the anesthetic-surgical procedure and the nerve injury, nevertheless expressed her doubts about the possible mechanism. Both presented mechanisms are controversial, the literature is far from being unanimous regarding the real cause of injury in this kind of situation.

The court could not reach a clear conclusion, the insurance company covering the hospital decided to pay a significant sum as a compensation for the damage, but did not admit negligence.

A Final Line:

Some conclusions can be drawn from this case:

1. anesthesia is a profession more prone than other medical specialties in danger to be accused of negligence;
2. this situation obliges the anesthesiologist to be aware of the presence of possible injury produced to any patient, which could bring the case in court;
3. the future of each legal case is unsure up to the last moment;
4. the main defending point could be the real situation in which sometimes one did a good thing, but the final outcome was negative.

08. Spinal Anesthesia in patients with aortic stenosis- *Across the line?*

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Background: Aortic stenosis is recognized as a valvular lesion that gives rise to several hemodynamic challenges for the anesthesia team [1, 2]. The use of neuraxial anaesthesia is traditionally regarded as contraindicated in patients with aortic stenosis, due to severe hypotension that may result secondary to sympatholysis and further decline of vascular tone, in the settings of an already decreased cardiac output [3–5].

The need for patients with aortic stenosis to undergo non-cardiac surgery has increased significantly recently, and consequently the concern for unwanted cardiovascular events or risk of death in the perioperative settings [6, 7]. Among the non-cardiac surgical emergencies in the geriatric population one of the most common is the hip fracture [7]. For these patients the prevalence of severe aortic stenosis (valve area $<1\text{ cm}^2$) is estimated between 5–10% [6]. In this scenario, minimizing time to surgery is one of the most important and also a modifiable risk factor for reducing mortality, along with avoiding perioperative hypotension [8, 9].

An audible cardiac murmur is identified during examination in a quarter of patients with hip fracture and usually no documented evidence of the valvular lesion is available at the time of admission [10]. Although it is prudent to assess patients with high risk for cardiovascular events, recent data recommends not to delay surgery pending the results of transthoracic echocardiography [11–13]. Instead, Focused cardiac ultrasound is a goal-directed, short form of echocardiography, which may be performed by anesthetists [14]. Without delaying surgery, it increases bed-side clinical assessment, enhances diagnostic accuracy and guides acute management [10, 14, 15].

Currently there are no randomised clinical trials on the prognostic role of aortic stenosis in hip fracture surgery and existing literature is extremely sparse. A literature overview concluded that overall neuraxial anaesthesia is correlated with a reduced in-hospital mortality and length of hospital stay in comparison to general anaesthesia [16]. Also, an interesting comparison in patients with several grades of aortic stenosis who received either spinal anaesthesia or general anaesthesia for lower extremity surgery, found no significant differences in regard to mortality and serious complications (deep vein thrombosis, pulmonary embolism, myocardial infarction, and stroke) between the groups [17].

Adapting neuraxial anesthesia through several means may be the key for a positive outcome in patients with hip fracture who associate aortic stenosis. Avoiding hypotension, regardless the anesthetic technique, may be our primary goal, since mortality increases statistically significant as blood pressure incremental decreases [18, 19]. Recent findings describe hypotensive events more often during general anaesthesia than spinal anaesthesia [18]. Lowering the intrathecal dose of bupivacaine towards 1.4–1.5 mL and adding additives such as vasoconstrictors, alpha-2-adrenergic agonists, opioids or dexamethasone may significantly contribute to a more hemodynamically stable profile [18–21]. Moreover, reducing the speed of local anesthetic injection in spinal anesthesia may help to avoid usage of vasopressors [22]. Although age is not a modifiable risk factor, we must keep in mind that it is possible for the cerebral spinal fluid volume to shrink and the spinal nerves become more responsive to local anaesthetics in geriatric population [23, 24]. Also, by providing preoperative efficient analgesia through an ultrasound guided fascia iliaca compartment nerve block, we can increase patients' tolerance for a lateral decubitus position and thus perform spinal hemianesthesia, in order to reduce cardiovascular changes and restrict the motor and sensitive block to the side to be operated [25, 26].

Case Series: A series of 3 elderly patients, with ages between 83–87 years old, were brought to our emergency department after a mechanical fall from standing height and diagnosed with proximal femoral pertrochanteric fracture type III. For more clarity we provide the medical records and chronic treatment of the patients in Table 1. All had in common hypertension grade II–III and long treatment with beta blockers. The clinical examination of the patients revealed nothing outstanding, except for an audible ejection systolic reverse splitting of the second heart sound in the aortic area. None of them described signs of acute heart failure, nor history of syncope or angina pectoris. No particular paraclinical findings were identified and the electrocardiogram of all three of them exhibited sinus rhythm.

Table 1. Patients' medical records and chronic treatment.

Patient	Medical record	Chronic treatment
1	Large Hiatal Hernia	Esomeprazole
2	Hiatal Hernia Generalized anxiety disorder	Perindopril Esomeprazole Lorazepam
3	Parkinson Disease Dementia (mild)	Memantine Zopiclone

Given the emergency scenarios we have performed a Focused cardiac ultrasound and identified in the first patient moderate stenosis with mild left ventricular hypertrophy, in the second patient severe aortic stenosis with mild septal ventricular hypertrophy, as for the third patient severe aortic stenosis with mild concentric left ventricular hypertrophy. Peak aortic jet velocity $<4.5\text{ m/s}$ and a mean gradient $<43\text{ mmHg}$ was identified in all the 3 cases. No low gradient, low flow aortic stenosis was identified, and the left ventricular ejection was estimated for more than

45% in all the 3 cases. After discussing with the patients and family the perioperative plan, informed consent for every patient was provided. Each of the three patients opted for spinal hemianesthesia. The perioperative plan was shared and approved together with the orthopedic team.

In the preoperative area an intravenous line was placed, crystalloid solutions began to be infused, antibiotic prophylaxis and premedication was administered. An ultrasound guided fascia iliaca block (Ropivacaine 0.25%) was performed 30 minutes prior to surgical intervention. Under standard monitoring and after appropriate identification of the spines' bony landmarks, spinal hemianesthesia was performed in lateral position, through a midline or paramedian approach using either a 25 or a 27 gauge (anesthetist preference). Then, 8 mg hyperbaric bupivacaine and 0.025 mg fentanyl was slowly injected and lateral position was maintained for a further 10–15 minutes to enhance preferential lateral distribution. Hemodynamic parameters remained unchanged. Sensory level was examined and considered adequate for surgery to proceed. A dynamic hip screw procedure was performed in all 3 scenarios. The intraoperative blood loss was minimal. During surgery and in the immediate postoperative period, no significant blood pressure or heart rate variation was encountered. The mean arterial pressure maintained above 65 mmHg and vasopressors were not needed to be administered throughout this period. Sensory and motor function returned shortly after the procedure and no severe complications were encountered in the postoperative period. The patients were discharged in the following days.

Discussion: Up to the present moment there is no strong evidence to avoid spinal anesthesia in patients with aortic stenosis, including severe aortic stenosis. We acknowledge the dilemma whether or not to choose regional over general anesthesia for the anesthetic management of patients with hip fracture will not be solved for the time being and will remain an ongoing topic for debate. Independently of the result, we must bear in mind that both a negative or a positive result should not interfere with our clinical judgement.

Furthermore, we consider that carefully managed neuroaxial blockade could become a useful alternative to general anaesthesia in selected cases. In order to establish which of the patients associating hip fracture with aortic stenosis may benefit from neuroaxial blockade, large randomized clinical studies are necessary.

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09. Perioperative dexamethasone- effectiveness and side effects

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Background: The continuous concerns regarding the best way to ensure anesthesia have magnified in the last decades. In search of the Holy Grail, several attempts to improve anesthetic techniques and pain management have been proposed over the years.

In regards to perioperative outcomes, the ongoing debate between regional and general anesthesia failed to prove the superiority of one technique alone, although some results favors regional anesthesia in terms of perioperative complications, hospital mortality and hospital length of stay [1–5]. Instead, a common consensus underlines the pivotal role regional anesthesia has as part of a multimodal pain strategy and opioid sparing concept [6, 7].

Among the current challenges that lie ahead, extending the pain free postoperative period after a single shot injection technique remains one of the most provocative. Efficiency of analgesia in this setting is influenced by modifiable factors such as type, volume and concentration of the chosen local anaesthetic, as well as the presence of non-modifiable factors like diabetic neuropathy; but even in the best scenario analgesia is rarely extended over 16 h [8]. This aspect is particular important in surgical procedures associated with moderate to severe postoperative pain, when we can encounter the so-called rebound pain or the delayed onset of intense postoperative pain [8, 9]. In order to alleviate rebound pain several solutions to extend the duration of analgesia offered by regional anaesthesia have been proposed to be used. Between continuous catheter techniques, sustained-release local anaesthetics or pharmacological adjuncts, the latter gained popularity over the years [8]. Among the various perineural adjuncts, dexamethasone has been widely studied in terms of safety and efficacy [10].

Brought to light in 1961, dexamethasone is a long-acting synthetic glucocorticoid, with an anti-inflammatory potency above hydrocortisone or prednisolone and with neglectable mineralocorticoid activity [11, 12]. In comparison to other systemic glucocorticoid products, dexamethasone binds poorly to plasma proteins, is hepatic metabolized to inactive products and is mostly excreted in the urine within 24 hours [12].

Although well known primarily for its anti-inflammatory activity, the molecule proved further qualities. Thus, dexamethasone began to be frequently used in anesthesia due to widespread availability and low costs associated to its use in preventing and treating postoperative nausea and vomiting (PONV), reducing inflammation and providing analgesia [10, 12]. Furthermore, it’s been advocated that it can improve recovery and early discharge following anesthesia [12].

Currently dexamethasone is considered a first-line antiemetic drug for patients undergoing surgical intervention [13]. The mechanism of action is poorly understood and numerous hypotheses have been launched. Apart from the anti-inflammatory effect and central role in analgesia with concomitant dose reduction of opioids, the direct effect on the solitary tract nucleus and γ -aminobutyric acid (GABA) stores, as well as lowering the central levels of prostaglandins and serotonin have been employed [12, 13].

In comparison to other well-established antiemetic agents, dexamethasone proved as safe as ondansetron in postoperative emetic prophylaxis and even more efficient in the late postoperative stage (6–24 h) [14]. DREAMS trial collaborators findings indicates that a single dose of 8 mg dexamethasone in patients undergoing elective open or laparoscopic bowel surgery, reduces both the incidence of PONV at 24 hours and the use of rescue antiemetics for up to 72 hours, without an increase in complications [15]. As for the treatment of established PONV, current data

does not support dexamethasone usage regardless the dose regimen employed [16]. In diabetic patients, a multimodal anti-emetic approach is considered more appropriate for effective prophylaxis, since a low dose dexamethasone (4 mg) is advisable in order to minimize risk of hyperglycemia [17].

Current guidelines regarding PONV management recommends an intravenous dose of dexamethasone between 4 and 10 mg to be administered before or after the induction of anesthesia or right at the beginning of surgery [18]. Multiple doses are not supported unless if prolong operative duration is expected [18]. Several efficient combination therapies (5-HT₃ receptor antagonists, aprepitant, antihistamines, droperidol, midazolam) are cited [18].

The analgesic effect of the molecule is not an original object of study anymore due to the tremendous available data published up to now. Intravenous dexamethasone seems to sustain systemic analgesia and it was found that 8 mg dexamethasone given intraoperatively significantly decreases opioid consumption, rescue analgesics usage and reduces pain scores 24 h postoperatively [19, 20]. A subsequent dose of corticosteroid was found to maintain reduced pain scores on the following postoperative days, but current evidence does not support repeated-dose over single-dose dexamethasone to improve analgesia [20, 21]. Interesting data found that in patients undergoing regional anesthesia, co-administration of intravenous dexamethasone and dexmedetomidine further increases time to first rescue analgesic request and half of patients receiving the combination do not necessitate rescue analgesics for up to 72 h postoperatively [22].

The safety profile of dexamethasone has encouraged further its usage in both peripheral blocks and central neuraxial blockade. The first clinical trial to investigate the efficacy of perineural dexamethasone was published in 2003 and reported a significantly prolonged brachial plexus block after adding dexamethasone without any unwanted effects [23].

Although the optimal perineural dose remains uncertain, very low-quality evidence supports that 4 mg represents a ceiling dose that prolongs analgesia duration up to 8 hours when combined with local anesthetics [24].

The initial findings that perineural dexamethasone may prolong the duration of analgesia compared to intravenous administration were further investigated and sustained by low quality evidence [25]. Recent published data suggests no advantage of perineural over intravenous dexamethasone, and a more recent systematic review of 2216 relevant academic articles concluded that intravenous dexamethasone should be considered to prolong the duration of analgesia [26, 27].

Although no neurological sequelae have been reported, the perineural use is considered off label, since lack of evidence for neurotoxicity is not considered strong evidence for absence of neurological complications [10, 28]. Another unwanted perineural effect described by literature is the crystallization reaction that appears when adding dexamethasone to ropivacaine, but not to bupivacaine or lidocaine [29].

As for the effect on neuromuscular blockade, the published experimental data concluded that dexamethasone administration shortens the duration of rocuronium-induced neuromuscular block, without affecting sugammadex-induced neuromuscular recovery even after chronic dexamethasone exposure [30, 31]. Human available data found that 8 mg of dexamethasone administered a couple of hours prior to surgery may quicken the onset and recovery of cisatracurium induced-neuromuscular block [12, 32]. A systematic review with meta-analysis identified a neutral effect of dexamethasone on sugammadex reversal of rocuronium-induced neuromuscular blockade in patients undergoing general anesthesia for surgical procedures and a slight delay in pediatric population [33].

Limited data exists on dexamethasone effect on shivering [12]. A recent study shown that 4 mg of dexamethasone was as effective as 25 mg of meperidine in attenuation of shivering when administered intrathecal in patients under spinal anesthesia for transurethral prostatectomy and also with less adverse events [34].

In regards to quality of recovery after general anesthesia and surgery, dexamethasone may reduce the incidence of post-operative cognitive decline in elderly patients, especially when associated with intraoperative neuromonitoring *via* BIS with values between 46–55. This may be the result of some degree of neuroprotection attributed to the lower levels of brain injury biomarker S100 β [35].

Although dexamethasone proves to have important qualities, there are concerns regarding several adverse effects. The potential increased risk of postoperative wound infection following dexamethasone administration has been study in high-risk non-cardiac surgical patients, including patients undergoing total joint arthroplasty. The studies concluded that intravenous dexamethasone does not increase the risk of postoperative wound infection or other adverse events, even in patients with diabetes mellitus [36, 37]. Furthermore, a systematic review including 37 studies found no evidence of postoperative wound infection related to dexamethasone administration in the perioperative period [38].

The extent of blood glucose increment in diabetic patients undergoing elective surgery was also evaluated following different dexamethasone regimens intended for PONV prophylaxis. Although glycemic response was significantly greater in patients receiving dexamethasone, an increment of 25 mg/dL of blood glucose was identified only when 8–10 mg of dexamethasone was administered [38, 39]. A recently published randomised controlled trial on Perioperative Administration of Dexamethasone And blood Glucose concentrations in patients undergoing elective non-cardiac surgery (PADDAG trial) concluded that a single dose of intravenous dexamethasone does not influence the maximal blood glucose concentrations in the first 24 h after surgery in nondiabetic patients and in diabetic patients with good glycemic control. Furthermore, in patients with higher pre-operative HbA_{1c}

concentrations the effect of 8 mg of dexamethasone on maximal postoperative blood glucose concentrations was significant; thus the authors recommend to avoid this dose regimen for patients with poor chronic glycemic control [40].

There are limited data in the literature regarding the potential effect on glycemic response following injection of perineural glucocorticoids during regional anesthesia. One study reported higher levels of serum glucose for the first 48 h after surgery, but with resolution by the third postoperative day, with probably no clinical significance [41].

Other interesting findings suggest even a slightly better glycemic control in patients with type 2 diabetes undergoing total hip arthroplasty who received dexamethasone perioperative and also a significantly lower hospital length of stay [42].

In regards to avascular necrosis of the humeral and femoral heads, current data do not describe this adverse event following a single dose of dexamethasone administered perioperative or as long as we limit the dose regimen and time frame of treatment [43].

Another unwanted side effect related to intravenous bolus injection of dexamethasone, which some patients may experience is a transient perineal itch and pain. The mechanism of occurrence is unknown, but can be diminished by diluting the dexamethasone in 50 mL of 0.9% saline or by administering lidocaine. Because this transient pain can't be always avoided, is advisable to use intravenous dexamethasone after induction or performing spinal anaesthesia [44–46].

Conclusions: Dexamethasone is not considered far from being an ideal peri-operative agent since the benefits outweighs the risks of its usage in postoperative settings. Up to present no other molecule exhibited dexamethasone's combined properties for suppressing inflammation, preventing PONV, assuring and maintaining analgesia, together with improving postoperative recovery. Furthermore, if used in low dose regimen, dexamethasone is considered safe even for diabetic patients, without a significant increase in blood glucose levels or the risk of wound infection.

Although some controversial roles have been described, dexamethasone possess a favourable risk: benefit profile for a peri-operative agent.

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10. The Polyanalgesic Consensus Conference (PACC): Recommendations on Intrathecal Drug Infusion Systems Best Practices and Guidelines

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This was a comprehensive oral review of the publication “The Polyanalgesic Consensus Conference (PACC): Recommendations on Intrathecal Drug Infusion Systems Best Practices and Guidelines” by Deer *et al.* in *Neuromodulation* 2017; 20: 96–132. The United States Preventive Services Task Force (USPSTF) hierarchy of studies and recommendation degrees were reviewed along with the USPSTF rating for intrathecal therapy including a comparison of intrathecal therapy versus neuromodulation. Cancer patient classifications and strength of consensus definitions were described. The pain care algorithm for noncancer or non-end-of-life pain, the cancer-related pain care algorithm, and the patient selection criteria and algorithm were discussed. Recommendations for avoiding surgical site infections were also reviewed. Medications for cancer or other terminal condition with localized pain, medications for cancer or other terminal condition with diffuse pain, medications for non-cancer pain with localized pain, and medications for non-cancer pain with diffuse pain were reviewed along with the evidence level for them. Next recommended starting dosage ranges, recommended doses for bolus trialling, and maximum concentrations & daily doses were discussed. Finally, recommendations regarding clonidine, baclofen, the infusion rate, and the baseline dose of opioids were reviewed.

11. Rx (Oral Medications) in Chronic Pain

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The lectured reviewed classes of oral medications for chronic pain, identified mechanisms of action, identified advantages and disadvantages of each medication, and identified the utility of medications in patients with chronic pain and comorbid psychiatric or medical disorders. The following classes of oral medications for pain were reviewed with an emphasis on highlighting benefits for both pain and, if possible, mood, anxiety, sleep, weight loss, and/or substance use disorder(s) (*e.g.*, alcohol use disorder, tobacco use disorder, stimulant use disorder). Acetaminophen/paracetamol, nonsteroidal anti-inflammatory drugs (NSAIDs), aspirin, tricyclic antidepressants, serotonin norepinephrine reuptake inhibitors (SNRIs), bupropion, selective serotonin reuptake inhibitors (SSRIs), antiepileptics/membrane stabilizers, muscle relaxants, synthetic opioids, semi-synthetic opioids, mixed opioid agonists/antagonists, and glucocorticoid steroids were all reviewed in detail.

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