Signa Vitae

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

Gabriel M. Gurman[1,*]

[1]*Ben Gurion University of the Negev, Israel.*
*Corresponding Author: Gabriel M. Gurman (gurman@bgu.ac.il)

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 90º, 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*?

Ana-Maria Cotae[1,2,*], Raluca Ungureanu[1,2], Liliana Mirea[1,2]

[1]*Faculty of Medicine, "Carol-Davila" University of Medicine and Pharmacy, Bucharest, Romania;*
[2]*Anaesthesiology and Intensive Care Clinic, Clinical Emergency Hospital Bucharest, Romania.*
*Corresponding Author: Ana-Maria Cotae (cotae_ana_maria@yahoo.com)

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 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 anesthesia [16]. Also, an interesting comparison in patients with several grades of aortic stenosis who received either spinal anesthesia or general anesthesia 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 m/s and a mean gradient <43 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 administer throughout this period. Sensory and motor functioned 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.

References

[1] Christ M, Sharkova Y, Geldner G, Maisch B. Preoperative and perioperative care for patients with suspected or established aortic stenosis facing noncardiac surgery. Chest. 2005; 128: 2944–2953.

[2] Hines RL. Stoelting's Anesthesia and co-existing disease. 7th ed. Amsterdam: Elsevier. 2018.

[3] Miller R. Miller's anesthesia. 8th ed. Amsterdam: Elsevier Health Sciences. 2014.

[4] Brown J, Morgan-Hughes NJ. Aortic stenosis and non-cardiac surgery. Continuing Education in Anaesthesia Critical Care & Pain. 2005; 5: 1–4.

[5] Johansson S, Lind MN. Central regional anaesthesia in patients with aortic stenosis—a systematic review. Danish Medical Journal. 2017; 64: A5407.

[6] Andersson C, Jørgensen ME, Martinsson A, Hansen PW, Gustav Smith J, Jensen PF, *et al*. Noncardiac surgery in patients with aortic stenosis: a contemporary study on outcomes in a matched sample from the Danish health care system. Clinical Cardiology. 2014; 37: 680–686.

[7] Rostagno C, Ranalli C, Polidori G, Cartei A, Boccaccini A, Peris A. Outcome in elderly patients with aortic stenosis undergoing hip fracture surgery. Results may suggest a different postoperative strategy? Trauma Surgery & Acute Care Open. 2019; 4: e000218.

[8] Daugaard CL, Jørgensen HL, Riis T, Lauritzen JB, Duus BR, van der Mark S. Is mortality after hip fracture associated with surgical delay or admission during weekends and public holidays? A retrospective study of 38,020 patients. Acta Orthopaedica. 2012; 83: 609–613.

[9] Griffiths R, Babu S, Dixon P, Freeman N, Hurford D, Kelleher E, *et al*. Guideline for the management of hip fractures 2020: guideline by the association of anaesthetists. Anaesthesia. 2021; 76: 225–237.

[10] Canty DJ, Heiberg J, Yang Y, Royse AG, Margale S, Nanjappa N, *et al*. Pilot multi-centre randomised trial of the impact of pre-operative focused cardiac ultrasound on mortality and morbidity in patients having surgery for femoral neck fractures (ECHONOF-2 pilot). Anaesthesia. 2018; 73: 428–437.

[11] Fleisher LA, Beckman JA, Brown KA, Calkins H, Chaikof EL, Fleischmann KE, *et al*. ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery: executive summary. Circulation. 2007; 116: 1971–1996.

[12] Shiga T, Wajima Z, Ohe Y. Is operative delay associated with increased mortality of hip fracture patients? Systematic review, meta-analysis, and meta-regression. Canadian Journal of Anesthesia. 2008; 55: 146–154.

[13] Bretherton CP, Parker MJ. Early surgery for patients with a fracture of the hip decreases 30-day mortality. The Bone and Joint Journal. 2015; 97-B: 104–108.

[14] Spencer KT, Kimura BJ, Korcarz CE, Pellikka PA, Rahko PS, Siegel RJ. Focused cardiac ultrasound: recommendations from the American society of echocardiography. Journal of the American Society of Echocardiography. 2013; 26: 567–581.

[15] Heiberg J, El-Ansary D, Canty DJ, Royse AG, Royse CF. Focused echocardiography: a systematic review of diagnostic and clinical decision-making in anaesthesia and critical care. Anaesthesia. 2016; 71: 1091–1100.

[16] Van Waesberghe J, Stevanovic A, Rossaint R, Coburn M. General *vs.* neuraxial anaesthesia in hip fracture patients: a systematic review and meta-analysis. BMC Anesthesiology. 2017; 17: 87.

[17] Chaves-Cardona H, Renew J, Spaulding A, Porter S. Comparison of mortality and serious complications in lower extremity total joint arthroplasty patients with aortic stenosis receiving spinal versus general anesthesia. Anaesthesiology Intensive Therapy. 2022; 54: 108–113.

[18] Royal College of Physicians and Association of Anaesthetists of Great Britain and Ireland. Anaesthesia sprint audit of practice. 2014. Available at: http://www.nhfd.co.uk/20/hipfractureR.nsf/vwContent/asapReport/$file/onlineASAP.pdf (Accessed: 03 May 2016).

[19] White SM, Moppett IK, Griffiths R, Johansen A, Wakeman R, Boulton C, *et al*. Outcomes after anaesthesia for hip fracture surgery. Secondary analysis of prospective observational data from 11,085 patients included in the UK Anaesthesia Sprint Audit of Practice (ASAP-2). Anaesthesia. 2015; 71: 506–514.
[20] Bani-Hashem N, Hassan-Nasab B, Pour EA, Maleh PA, Nabavi A, Jabbari A. Addition of intrathecal Dexamethasone to Bupivacaine for spinal anesthesia in orthopedic surgery. Saudi Journal of Anaesthesia. 2011; 5: 382–386.
[21] Sharma A, Kumar R. Dexamethasone as an adjuvant to Bupivacaine for spinal anesthesia. Journal of Advanced Medical and Dental Sciences Research. 2019; 7: 218–222.
[22] Jacob AR, Paul J, Rajan S, Ravindran GC, Kumar L. Effect of injection speed of heavy bupivacaine in spinal anesthesia on quality of block and hemodynamic changes. Anesthesia, Essays and Researches. 2021; 15: 348–351.
[23] Liu SS, Ware PD, Allen HW, Neal JM, Pollock JE. Dose-response characteristics of spinal bupivacaine in volunteers. Clinical implications for ambulatory anesthesia. Anesthesiology. 1996; 85: 729–736.
[24] Racle JP, Benkhadra A, Poy JY, Gleizal B. Spinal analgesia with hyperbaric bupivacaine: influence of age. British Journal of Anaesthesia. 1988; 60: 508–514.
[25] Capdevila X, Biboulet P, Bouregba M, Barthelet Y, Rubenovitch J, d'Athis F. Comparison of the three-in-one and fascia iliaca compartment blocks in adults: clinical and radiographic analysis. Anesthesia and Analgesia. 1998; 86: 1039–1044.
[26] Imbelloni LE. Spinal hemianesthesia: unilateral and posterior. Anesthesia, Essays and Researches. 2014; 8: 270–276.

09. Perioperative dexamethasone- effectiveness and side effects

Liliana Elena Mirea[1,*]

[1]*Carol Davila University of General Medicine, Bucharest, Romania;*
[2]*Anaesthesia and Intensive Care Unit I, Clinical Emergency Hospital of Bucharest, Romania.*
*Corresponding Author: Liliana Elena Mirea (llmirea@yahoo.com)

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 multi-modal 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 S100β [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 HbA1c

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.

References

[1] Memtsoudis SG, Sun X, Chiu YL, Stundner O, Liu SS, Banerjee S, *et al*. Perioperative comparative effectiveness of anesthetic technique in orthopedic patients. Anesthesiology. 2013; 118: 1046–1058.

[2] Perlas A, Chan VW, Beattie S. Anesthesia technique and mortality after total hip or knee arthroplasty: a retrospective, propensity score-matched cohort study. Anesthesiology. 2016; 125: 724–731.

[3] Cata JP. Outcomes of regional anesthesia in cancer patients. Current Opinion in Anaesthesiology. 2018; 31: 593–600.

[4] Van Waesberghe J, Stevanovic A, Rossaint R, Coburn M. General *vs.* neuraxial anaesthesia in hip fracture patients: a systematic review and meta-analysis. BMC Anesthesiology. 2017; 17: 87.

[5] Guay J, Parker MJ, Gajendragadkar PR, Kopp S. Anaesthesia for hip fracture surgery in adults. Cochrane Database of Systematic Reviews. 2016; 2: CD000521.

[6] Chitnis SS, Tang R, Mariano ER. The role of regional analgesia in personalized postoperative pain management. Korean Journal of Anesthesiology. 2020; 73: 363–371.

[7] Chen YK, Boden KA, Schreiber KL. The role of regional anaesthesia and multimodal analgesia in the prevention of chronic postoperative pain: a narrative review. Anaesthesia. 2021; 76: 8–17.

[8] Albrecht E, Chin KJ. Advances in regional anaesthesia and acute pain management: a narrative review. Anaesthesia. 2020; 75: e101–e110.

[9] Sunderland S, Yarnold CH, Head SJ, Osborn JA, Purssell A, Peel JK, *et al*. Regional versus general anesthesia and the incidence of unplanned health care resource utilization for postoperative pain after wrist fracture surgery: results from a retrospective quality improvement project. Regional Anesthesia and Pain Medicine. 2016; 41: 22–27.

[10] Albrecht E, Kern C, Kirkham KR. A systematic review and meta-analysis of perineural dexamethasone for peripheral nerve blocks. Anaesthesia 2015; 70: 71–83.

[11] American Chemical Society. Molecule of the Week Archive—Dexamethasone. 2020. Available at: https://www.acs.org/molecule-of-the-week/archive/d/dexamethasone.html (Accessed: 15 March 2023).

[12] Gupta B. Role of dexamethasone in peri-operative anesthesia management: a review of literature. Anesthesiology Open Journal. 2017; 2: 33–39.

[13] Chu CC, Hsing CH, Shieh JP, Chien CC, Ho CM, Wang JJ. The cellular mechanisms of the antiemetic action of dexamethasone and related glucocorticoids against vomiting. European Journal of Pharmacology. 2014; 722: 48–54.

[14] Wang XX, Zhou Q, Pan DB, Deng HW, Zhou AG, Huang FR, *et al*. Dexamethasone versus ondansetron in the prevention of postoperative nausea and vomiting in patients undergoing laparoscopic surgery: a meta-analysis of randomized controlled trials. BMC Anesthesiology. 2015; 15: 118.

[15] DREAMS Trial Collaborators and West Midlands Research Collaborative. Dexamethasone versus standard treatment for postoperative nausea and vomiting in gastrointestinal surgery: randomised controlled trial (DREAMS Trial). BMJ. 2017; 357: j1455.

[16] Czarnetzki C, Albrecht E, Desmeules J, Kern C, Corpataux JB, Gander S, *et al*. Dexamethasone for the treatment of established postoperative nausea and vomiting: a randomised dose finding trial. European Journal of Anaesthesiology. 2022; 39: 549–557.

[17] Albrecht E, Wiles MD. Peri-operative management of diabetes: the need for a lead. Anaesthesia. 2019; 74: 845–849.

[18] Gan TJ, Belani KG, Bergese S, Chung F, Diemunsch P, Habib AS, *et al*. Fourth consensus guidelines for the management of postoperative nausea and vomiting. Anesthesia and Analgesia. 2020; 131: 411–448.

[19] Samona J, Cook C, Krupa K, Swatsell K, Jackson A, Dukes C, *et al*. Effect of intraoperative dexamethasone on pain scores and narcotic consumption in patients undergoing total knee arthroplasty. Orthopaedic Surgery. 2017; 9: 110–114.

[20] Liang S, Xing M, Jiang S, Zou W. Effect of intravenous dexamethasone on postoperative pain in patients undergoing total knee arthroplasty: a systematic review and meta-analysis. Pain Physician. 2022; 25: E169–E183.
[21] Lex JR, Edwards TC, Packer TW, Jones GG, Ravi B. Perioperative systemic dexamethasone reduces length of stay in total joint arthroplasty: a systematic review and meta-analysis of randomized controlled trials. The Journal of Arthroplasty. 2021; 36: 1168–1186.
[22] Kang RA, Jeong JS, Yoo JC, Lee JH, Gwak MS, Choi SJ, *et al*. Improvement in postoperative pain control by combined use of intravenous dexamethasone with intravenous dexmedetomidine after interscalene brachial plexus block for arthroscopic shoulder surgery: a randomised controlled trial. European Journal of Anaesthesiology. 2019; 36: 360–368.
[23] Shrestha BR, Maharjan SK,Tabedar S. Supraclavicular brachial plexus block with and without dexamethasone—a comparative study. Kathmandu University Medical Journal. 2003; 1: 158–160.
[24] Kirkham KR, Jacot-Guillarmod A, Albrecht E. Optimal dose of perineural dexamethasone to prolong analgesia after brachial plexus blockade: a systematic review and meta-analysis. Anesthesia and Analgesia. 2018; 126: 270–279.
[25] Heesen M, Klimek M, Imberger G, Hoeks SE, Rossaint R, Straube S. Co-administration of dexamethasone with peripheral nerve block: intravenous vs perineural application: systematic review, meta-analysis, meta-regression and trial-sequential analysis. British Journal of Anaesthesia. 2018; 120: 212–227.
[26] McHardy PG, Singer O, Awad IT, Safa B, Henry PDG, Kiss A, *et al*. Comparison of the effects of perineural or intravenous dexamethasone on low volume interscalene brachial plexus block: a randomised equivalence trial. British Journal of Anaesthesia. 2020; 124: 84–91.
[27] Tan ESJ, Tan YR, Liu CWY. Efficacy of perineural versus intravenous dexamethasone in prolonging the duration of analgesia when administered with peripheral nerve blocks: a systematic review and meta-analysis. Korean Journal of Anesthesiology. 2022; 75: 255–265.
[28] Pehora C, Pearson AM, Kaushal A, Crawford MW, Johnston B. Dexamethasone as an adjuvant to peripheral nerve block. Cochrane Database of Systematic Reviews. 2017; 11: CD011770.
[29] Watkins TW, Dupre S, Coucher JR. Ropivacaine and dexamethasone: a potentially dangerous combination for therapeutic pain injections. Journal of Medical Imaging and Radiation Oncology. 2015; 59: 571–577.
[30] Choi H, Park SY, Kim YB, In J, Yang HS, Lee JS, *et al*. Effects of dexamethasone and hydrocortisone on rocuroniuminduced neuromuscular blockade and reversal by sugammadex in phrenic nerve-hemidiaphragm rat model. Korean Journal of Anesthesiology. 2019; 72: 366–374.
[31] Park HY, Choi HR, Kim YB, Oh SK, Kim T, Yang HS, *et al*. Effect of chronic exposure to dexamethasone on rocuronium-induced neuromuscular blockade and sugammadex reversal: an *in vivo* study on rats. Research Square. 2021. [Preprint].
[32] So KY, Kim SH, Jung KT, Kim DW. Effect of dexamethasone on the onset time and recovery profiles of cisatracurium. Korean Journal of Anesthesiology. 2017; 70: 163–170.
[33] Lim BG, Won YJ, Kim H. The effect of dexamethasone on sugammadex reversal of rocuronium-induced neuromuscular blockade in surgical patients undergoing general anesthesia: a systematic review and meta-analysis. Medicine. 2021; 100: e23992.
[34] Moeen SM, Moeen AM. Intrathecal dexamethasone vs. meperidine for prevention of shivering during transurethral prostatectomy: a randomized controlled trial. Acta Anaesthesiologica Scandinavica. 2017; 61: 749–757.
[35] Valentin LS, Pereira VF, Pietrobon RS, Schmidt AP, Oses JP, Portela LV, *et al*. Effects of single low dose of dexamethasone before noncardiac and nonneurologic surgery and general anesthesia on postoperative cognitive dysfunction—a phase III double blind, randomized clinical trial. PLOS ONE. 2016; 11: e0152308.
[36] Corcoran TB, Myles PS, Forbes AB, Cheng AC, Bach LA, O'Loughlin E, *et al*.; PADDI Investigators; Australian and New Zealand College of Anaesthetists Clinical Trials Network; Australasian Society for Infectious Diseases Clinical Research Network. Dexamethasone and surgical-site infection. The New England Journal of Medicine. 2021; 384: 1731–1741.
[37] Richardson AB, Bala A, Wellman SS, Attarian DE, Bolognesi MP, Grant SA. Perioperative dexamethasone administration does not increase the incidence of postoperative infection in total hip and knee arthroplasty: a retrospective analysis. The Journal of Arthroplasty. 2016; 31: 1784–1787.
[38] Polderman JA, Farhang-Razi V, Van Dieren S, Kranke P, DeVries JH, Hollmann MW, *et al*. Adverse side effects of dexamethasone in surgical patients. Cochrane Database of Systematic Reviews. 2018; 11: CD011940.
[39] Low Y, White WD, Habib AS. Postoperative hyperglycemia after 4- *vs* 8–10-mg dexamethasone for postoperative nausea and vomiting prophylaxis in patients with type II diabetes mellitus: a retrospective database analysis. Journal of Clinical Anesthesia. 2015; 27: 589–594.
[40] Corcoran TB, O'Loughlin E, Chan MTV, Ho KM. Perioperative administration of dexamethasone and blood glucose concentrations in patients undergoing elective non-cardiac surgery - the randomised controlled PADDAG trial. European Journal of Anaesthesiology. 2021; 38: 932–942.
[41] Sharma A, Dai F, Tseng L, Effraim PR, Zhou B, Schonberger RB, *et al*. Systemic effects of perineural glucocorticoids on fasting serum glucose, potassium, and white blood cell count in total hip arthroplasty. Journal of Pain Research. 2023; 16: 553–561.
[42] Williams V, Uddin Ansari MJ, Jaju A, Ward S, O'Keefe D, Abdelkarim J, *et al*. Impact of perioperative dexamethasone on hospital length of stay and glycemic control in patients with type 2 diabetes undergoing total hip arthroplasty. Journal of Patient-Centered Research and Reviews. 2023; 10: 4–12.
[43] Agarwala SR, Vijayvargiya M, Pandey P. Avascular necrosis as a part of 'long COVID-19'. BMJ Case Reports. 2021; 14: e242101.
[44] Klygis LM. Dexamethasone-induced perineal irritation in head injury. The American Journal of Emergency Medicine. 1992; 10: 268.
[45] Neff SP, Stapelberg F, Warmington A. Excruciating perineal pain after intravenous dexamethasone. Anaesthesia and Intensive Care. 2002; 30: 370–371.
[46] Wang J, Li J, Cao H, Zhou X, Tang Q. Intravenous lidocaine suppresses dexamethasone-induced perineal pruritus during anesthesia induction: a randomized controlled, double blind study. Pakistan Journal of Pharmaceutical Sciences. 2015; 28: 569–572.

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

Emanuel N. Husu[1,2,*]

[1]*H. Ben Taub Department of Physical Medicine and Rehabilitation, Baylor College of Medicine, Houston, TX, USA;* [2]*Department of Clinical Sciences, Chicago Medical School, Rosalind Franklin University of Medicine and Science, North Chicago, IL, USA.*
*Corresponding Author: Emanuel N. Husu (enhusu@gmail.com)

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

Emanuel N. Husu[1,2,*]

[1]*H. Ben Taub Department of Physical Medicine and Rehabilitation, Baylor College of Medicine, Houston, TX, USA;* [2]*Department of Clinical Sciences, Chicago Medical School, Rosalind Franklin University of Medicine and Science, North Chicago, IL, USA.*
*Corresponding Author: Emanuel N. Husu (enhusu@gmail.com)

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.

How to cite this article: Organizing Committee of ARAR 2023. Abstracts of the 7th edition of "National Congress of the Romanian Association of Regional Anesthesia and Pain Therapy (ARAR)". Signa Vitae. 2023. doi: 10.22514/sv.2023.094.