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Review article

Pre-operative anesthetic assessment of patients with rheumatoid arthritis

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ABSTRACT

The management and surgical interventions of problems directly or indirectly arising from rheumatoid arthritis vary drastically. Anesthesiologists and rheumatologists should be aware of the peculiarities of the anesthetic preoperative assessment of these patients, including the assessment of possible disorders of the airways, in addition to the intra-operative management and analysis of relevant pharmacological parameters. It is critical that the anesthetist is familiar with the peculiarities of the disease and the specific characteristics of drugs used in its treatment: thus, he/she will be able to plan the best possible anesthetic technique for the surgery in question, offering safety and comfort to his/her patient. It is up to the rheumatologist to know the procedure to which the patient will be submitted to and be aware of the most appropriate anesthetic technique in each case. This will allow a better interaction between the rheumatologist and the anesthesiologist in the pre-anesthetic evaluation, through the sharing of relevant information on the articular and systemic involvement by the disease that might interfere with preoperative and intraoperative management. Furthermore, the information on the pre-anesthetic assessment and the choice of anesthetic technique will enable the rheumatologist to clarify any doubts that his/her patient and family may have, as well as to guide them as to whether or not the medications in use should be maintained, and eventually about the need for a supplemental dose of corticosteroid. The objective of this review is to acquaint the rheumatologist with key concepts related to the anesthetic preoperative assessment of patients diagnosed with RA, mainly including general notions that dictate the choice of the anesthetic technique.

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Avaliação anestésica pré-operatória de pacientes com artrite reumatoide

Palavras-chave:
Artrite reumatoide
Anestesia
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RESUMO

O manejo e as intervenções cirúrgicas de problemas decorrentes direta ou indiretamente da artrite reumatoide variam drasticamente. O anestesiologista e o reumatologista devem estar atentos às peculiaridades da avaliação anestésica pré-operatória desses pacientes, incluindo a avaliação de possíveis distúrbios das vias aéreas, além do manejo intraoperatório e da análise dos parâmetros farmacológicos pertinentes. É essencial que o médico anestesiologista esteja familiarizado com as peculiaridades da doença e com as características específicas das drogas utilizadas no seu tratamento, pois, assim, ele poderá planejar da melhor forma possível a técnica anestésica para o ato cirúrgico em questão, oferecendo segurança e conforto ao paciente. Ao reumatologista, cabe conhecer o procedimento a que o paciente será submetido e ter noção da técnica anestésica mais indicada em cada caso. Isso permitirá melhor interação entre o reumatologista e o anestesiologista na avaliação pré-anestésica, através do compartilhamento de informações relevantes sobre o acometimento articular e sistêmico pela doença que possam interferir com o manejo pré e intraoperatório. Além disso, as informações sobre a avaliação pré-anestésica e a escolha da técnica de anestesia contribuirão para que o reumatologista possa esclarecer dúvidas que o paciente e seus familiares porventura apresentem, bem como orientá-los quanto à manutenção ou não das medicações em uso e, eventualmente, da necessidade de suplementação da dose do corticosteroide. O objetivo desta revisão é familiarizar o reumatolostia com os principais conceitos relacionados à avaliação anestésica pré-operatória de pacientes com diagnóstico de AR, incluindo, principalmente, as noções gerais que ditam a escolha da técnica anestésica.

Introduction

Rheumatoid arthritis (RA) is a systemic, chronic, progressive inflammatory disease, which mainly affects the synovial membrane, and which can lead to bone and cartilaginous destruction. The management and surgical interventions of conditions directly or indirectly arising from RA vary drastically.[1,2]

Anesthesiologists and rheumatologists should be aware of the peculiarities of the anesthetic preoperative assessment of these patients, including the assessment of possible disorders of the airways, in addition to the intra-operative management and analysis of relevant pharmacological parameters.[3]

The objective of this review is to acquaint the rheumatologist with key concepts related to the anesthetic preoperative assessment of patients diagnosed with RA, mainly including general notions that dictate the choice of the anesthetic technique.

Methodology

From June to December 2012, a literature review was performed, including searches using the following databases: Medline (1990-2012), Cochrane Library, Lilacs, Pubmed (1990-2012) and Scopus, in English, Portuguese and Spanish languages. The key words used were "artrite reumatoide" (rheumatoid arthritis), "avaliação pré-operatória" (preoperative evaluation), "propofol" (propofol), "etomidato" (etomidate), "anestesia venosa total" (total intra-venous anesthesia), "anestesia geral" (general anesthesia), "anestesia regional" (regional anesthesia) and "controle das vias aéreas" (airway control).

Preoperative evaluation

The goals of a preoperative assessment of patients with RA are assessing the extent of disease involvement, its systemic consequences and possible adverse effects of therapies in use, to minimize the risk of anesthetic and surgical procedures.[4]

In the preoperative evaluation of patients with RA, in addition to a routine history and physical examination applicable to all patients (a record of the surgical procedure that will be performed, systemic medical evaluation, a history of drug use, prior surgeries, allergies, a detailed physical examination and relevant ancillary tests), an evaluation of the extent of involvement of the disease and its possible implications regarding the anesthetic technique should be performed.

We list the affections (divided by topics) of the sites most commonly involved by RA which entail special considerations for the anesthetic procedure.

Cervical spine

Regarding the involvement of peripheral joints, especially the hands, RA may affect the axial skeleton in the neck.[5] This involvement may occur both in an early as in a late stage of the disease. Most patients are asymptomatic, but about 40-85% may have neck pain associated with the radiographic

presence of instabilities (atlanto-axial subluxation and superior migration of the odontoid process).[6,7]

An interesting prospective observational trial that included 100 patients with early RA (<1 year of symptoms) showed atlanto-axial subluxation in 12% of the cases within the first 5 years of the disease.[8]

A radiological evaluation of the cervical region in a neutral profile, with maximum flexion and extension, prior to elective surgical and endoscopic procedures, can be performed in patients with RA.[6,9] Trials that show the actual cost-effectiveness of this routine assessment in the management of anesthesia and surgery are still lacking.[9]

Fiber optic laryngoscopes can be employed in the management of patients with RA when general anesthesia with intubation is considered necessary.[10] In this situation, it is important that efforts are employed to prevent hyperextension of the neck, a common occurrence in airways manoeuvres.

Temporomandibular joint

RA can also affect the temporomandibular joints. For the anesthesia, the implication will be the reduction of mouth opening and a commonly occurring cervical stiffness that make difficult both the intubation procedures and the positioning of head and neck in surgeries performed in this region.[11]

Some authors recommend the use of the Mallampati score, mouth opening and mandible protrusion as preoperative predictors of temporomandibular dysfunction.[12]

Cricoarytenoid dysfunction

The larynx may be affected in approximately 80% of patients with RA.[13] Generally, patients are asymptomatic, but in those cases with symptoms, these can be represented by a foreign body sensation in the oropharynx, dysphagia, dyspnea, hoarseness, stridor, and also by an airway obstruction.[5,14,15]

The direct visualization of the larynx may reveal cricoarytenoid and vocal cords dysfunction during inspiration.[16]

In patients in whom this disorder is suspected , nasoendoscopy with visualization of the larynx is recommended, besides the use of the tracheal tube with a smaller diameter, a quiet intubation without trauma on the laryngeal structures, administration of oxygen by catheter after extubation, removal of the tracheal tube in an appropriate environment prepared for emergencies and, in severe cases, the possibility of a preventive preoperative tracheostomy.[15,17]

In the postoperative phase of RA patients, after the tracheal extubation the patient should be observed closely for signs of laryngeal dysfunction and airway obstruction.

Respiratory system

Another important aspect to be considered is the presence of lung injury. In fact, trials have shown a reduction in vital capacity and total lung volume in patients with RA, even in the absence of pulmonary fibrosis.[18,19] The presence of rheumatoid nodules is another possible injury that can lead to inflammation with possible dyspnea and accumulation of lung fluid.[18,19] The use of medications such as methotrexate brings a potential risk of lung disease.[19]

Cardiovascular system

Patients with RA may present early atherosclerosis secondary to dyslipidemia (particularly a reduction in HDL-cholesterol), presence of systemic hypertension and smoking.[20] The activity of inflammatory disease is also a factor to be considered.[21] Heart failure is a major cause of mortality in RA. Thus, a story addressed to atherosclerotic disease is mandatory in patients with RA who will be submitted to anesthetic procedures. In those patients with symptoms or risk factors, an assessment of cardiovascular situation through non-invasive methods such as ECG, echocardiography and myocardial scintigraphy is recommended. If ischemic lesions are detected, catheterization and possible corrections (i.e., angioplasty or CABG) are mandatory.

Impairment of the conduction system and valvular involvement are also possible.[22]

The risk for developing cardiovascular disease appears to be underestimated by the current methods employed; thus, an even greater attention to this group of patients is necessary.[23]

Renal system

The use of medications such as nonsteroidal anti-inflammatory drugs (NSAIDs) and cyclosporine may lead to a risk of kidney damage in patients with RA.[2,24]

Gastrointestinal system

The almost universal use of NSAIDs in patients with RA carries the risk of gastrointestinal tract injury.[24] In fact, trials show a higher prevalence of gastritis and ulceration with possible risk of bleeding in the digestive tract of these patients.[25,26] The prophylaxis of peptic ulcer and gastrointestinal bleeding should be performed, especially in NSAIDs users. Patients using glucocorticoids and with diverticulitis should be considered at high risk for perforation of the gastrointestinal tract.[27]

Endocrine system

The Cushing's syndrome characteristic effects of the glucocorticoids are well known. For those patients who are under prednisone or who used this drug within an year, there is a need to perform an intravenous injection of hydrocortisone 100 mg at the time of anesthesia induction.[28,29]

General measures such as prophylaxis of venous thrombosis should also be considered in patients with RA, such as the use of elastic stockings, adequate hydration and prophylactic use of heparin. One must bear in mind that these patients have limited mobility and some of them will have a longer post-operative recovery than patients not affected by this condition (50).[25]

Difficulties may emerge while handling catheters used for continuous blockages in patients on immunosuppressive therapy, corticosteroids and biologic drugs, due to an increased risk of infections. Some joint deformities resulting from RA can impact the conduct of anesthesia and the choice of the anesthetic technique, because they compromise the patient positioning during surgery and hinder the access to

the techniques of regional blockade, causing difficulties associated with nervous plexus blocks.[4]

Choice of the anesthetic technique

The choice of anesthetic technique generally depends on the general condition of the patient and on the type of proposed surgical procedure; there is not one specific optimal technique for patients with RA.[5,30] One should take into account the risks inherent to each technique, the possible side effects of the anesthetics used and the experience of the anesthesiologist. Table 1 summarizes the main anesthetic techniques used, including a brief description of the technique, its indications and absolute and relative contraindications, in addition to considerations on the appropriate choice for patients diagnosed with RA.

The use of general, inhalatory, total venous or balanced anesthesia may provide better control of the cardiovascular and respiratory systems, without imposing a time limit for the duration of surgery,[30] as it occurs with the use of non-continuous techniques of regional anesthesia. The use of general anesthesia is also useful in situations where there is a need to keep the patient in unusual or uncomfortable positions, as it occurs in some orthopedic and neurosurgical procedures.[5] Special attention should be paid to a proper protection of the limbs and neck in order to avoid worsening of pre-existing injury or the onset of a new lesion.[28,31]

Another very important aspect in general anesthesia procedures refers to the maintenance of airway patency. In this situation, the risk is due to pathological changes caused by RA, which are atlanto-axial subluxation and temporomandibular ankylosis.[30] During the manoeuvres of airway instrumentation, one incurs in the risk of worsening the situation and of possible permanent neurological injury.[28,31] Thus, a careful assessment of the presence and intensity of subluxation is required in the pre-anesthetic evaluation. In suspected or proven cases, the tracheal intubation manoeuvres should be gentle, avoiding sudden or exaggerated manoeuvres. As previously mentioned, the use of fiber optic bronchoscopy is of great help in such cases, because it allows an adequate access to the airways with minimal cervical mobilization.[30,32] In extreme cases, intubation with the patient awake can be easily achieved by a suitably trained anesthesiologist, with minimal sedation.[30,32]

Also with regard to the airways, the occurrence of ankylosis of the temporomandibular joint can bring additional risk during anesthesia, since the occurrence of small mouth openings to less than 2 cm is possible. Such cases will also benefit from the use of a flexible fiber optic bronchoscope.[32,33] An alternative to endotracheal intubation would be the use of a laryngeal mask, which provides a clear airway with less airway trauma.[34] Even so, the anesthesiologist must be careful, since there are reports that its use can worsen the symptoms of cricoarytenoid involvement of RA.[35]

Another aspect to be considered is the effect, on pharmacokinetics, of psychotropic drugs by the organic changes caused by the disease, or by its treatment. Cardiac changes could imply in the need of changes in hypnotic inducing drugs, with an option by less cardiodepressant medications such as etomidate or midazolam.[34,36,37] Hepatic or renal impairment may require drugs with less dependence on its exception, e.g., cisatracurium, the neuromuscular blocker of choice in cases of these organ dysfunctions (metabolism by plasma esterases)[38,39] and propofol or etomidate as hypnotic drugs and remifentanil as an opioid with plasma metabolism.[40] All these procedures are important in order to reduce the risk of drug recirculation, with possible deleterious effects such as respiratory depression and the eventual risk of an emergency approach to airways.[41,42]

An alternative to general anesthesia would be the use of one of the several techniques of regional anesthesia, in which sodium channel blocking drugs, the local anesthetics, are applied near peripheral nerves or nerve trunks, with no need for airway instrumentation.[43] The most common contraindications for the use of regional techniques are the use of anticoagulant drugs or of potent antiplatelet agents, patient objections, hemodynamic instability (in neuraxial techniques, because of the extensive sympathetic blockade) and infection at the puncture site.

The most common type of anesthesia for procedures on the lower limbs is the spinal anesthesia with the application of local anesthetics administered alone or in combination with opioids for the provision of an effective postoperative analgesia. The addition of clonidine or soluble opioids (e.g., sufentanil) to intratecal bupivacain significantly improves the duration and quality of spinal anesthesia and provides an extended perioperative analgesia, without significant side effects.[40,42] There is evidence of increased extent of subarachnoid blockade in patients with rheumatoid arthritis, and this may justify a reduction of the doses of anesthetics in these individuals.[44] Prolonged postoperative analgesia can be achieved through a combination of peripheral nerve blocks (e.g., femoral nerve, lumbosacral plexus, and tibial, saphenous or fibular nerves); this strategy yields an excellent analgesia with minimal side effects and less need for systemic opioids.[5]

Likewise, the anesthesiologist can choose the peridural use of local anesthetics as the selected technique; in this case he can recur to continuous techniques with peridural catheters, which ensures an extension of the anesthetic effect and the possibility of an efficient post-operative analgesia, contributing to less risk of thromboembolism, facilitating early ambulation and reducing the risk of pulmonary complications such as atelectasis and pneumonia.[45-48]

For the upper limbs, the brachial plexus anesthetic blockades fulfil a similar function, providing high quality anesthesia to the surgeon for prolonged periods and also allowing the option in favour of a continuous technique for the postoperative analgesia.[49,50]

Also with regard to the choice of drugs, attention should be paid to the use of drugs to treat the disease or to control the symptoms. NSAIDs can lead to gastrointestinal haemorrhages, and the steroids may predispose to adrenal insufficiency in stress situations, such as the surgical procedure, imposing the need for supplementation in the perioperative period.[29] Disease modifying drugs, such as methotrexate and leflunomide, may trigger peripheral neuropathies; their previous documentation is important in those cases in which the anesthesiologist favoured a regional technique, which use of the risk of nerve trauma can always be questioned.[3]

Table 1 – General characteristics of the most commonly used anesthetic techniques and considerations for their indications and contraindications in patients with RA

Anesthetic technique	Description	Indications	Relative contraindications	Absolute contraindications	Considerations for use in patients with RA
Inhalational anesthesia	The unconsciousness and analgesia remain by continuous inhalation of a halogenated anesthetic. Widely used in children without orotracheal intubation or with laryngeal mask.	Surgical procedures with less painful potential, as very high inhaled fractions are required to achieve surgical anesthesia for major surgery, with the emergence of side effects such as myocardial depression and vasodilatation.	Possible difficulty in airway control.	Past or suspected malignant hyperthermia, which can be triggered by the halogenated agent.	Need for airway manipulation; allows maintenance of the patient even in awkward positions.
General intravenous anesthesia	The analgesia, loss of consciousness and muscle relaxation are maintained through the use of various drugs. Currently there are infusion pumps that allow a controlled target infusion of medication (with the objective of achieving a certain plasma concentration) with rapid awakening. Intubation and controlled ventilation are required.	Any surgical procedure.	Possible difficulty in airway control.	If propofol was the chosen drug, allergy to any of the drugs used, mainly to egg and soy.	Need for airway manipulation; allows maintenance of the patient even in awkward positions.
Balanced general anesthesia	Association of intravenous drugs and inhaled agents, seeking lower doses of each class, and minimizing the side effects. Intubation and controlled ventilation required.	Any surgical procedure.	Possible difficulty in airway control.	Past or suspected malignant hyperthermia, which can be triggered by the halogenated agent. Allergy to any of the drugs used.	Need for airway manipulation; allows maintenance of the patient even in awkward positions.
Regional anesthesia	Administration of local anesthetics near nerve trunks or plexuses, or at cauda equina. Provides analgesia in great regions of the body, with consciousness and spontaneous ventilation maintained.	Surgical procedure restricted to the area of coverage of the anesthetized nerve trunk or plexus. The duration of the surgical act limited to the duration of the chosen local anesthetic agent.	Hypovolemia, coagulopathy, use of potent antiplatelet agents, anticoagulants, sepsis, infection at the puncture site.	No agreement by the patient.	Provides long-lasting analgesia; can be difficult to implement due to improper body positioning; obviate the manipulation of the airways.

Conclusion

With the evolution of RA treatment, the consequent increase in patients' life expectancy and reduction of morbidity and mortality, it will be increasingly common that these people have a need for any surgical procedure throughout their lives. It is therefore critical that the anesthetist is familiar with the peculiarities of the disease and the specific characteristics of the pharmacological agents used in its treatment. Thus, this professional can plan in the best possible way the anesthetic technique for the surgery in question, offering safety and comfort to his/her patient.

It is up to the rheumatologist to know the procedure that his/her patient will be submitted to and be aware of the most appropriate anesthetic technique in each case. This will allow better interaction between the rheumatologist and the anesthesiologist in the pre-anesthetic assessment, through the sharing of relevant information on the articular and systemic involvement by the disease that might interfere with the pre-operative and intraoperative management. Furthermore, the information on the pre-anesthetic assessment and the choice of anesthetic technique will enable the rheumatologist to clarify any doubts that his/her patient and family may have, as well as to guide them as to whether or not the medications in use should be maintained and eventually about the need for a supplemental dose of corticosteroid.

Conflicts of interest

The authors declare no conflicts of interest.

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