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"ANKYLOSING SPONDYLITIS - CLINICAL CONSIDERATIONS AND ANAESTHETIC MANAGEMENT"

Anesthesiology

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ABSTRACT

Ankylosing spondylitis (AS) is a chronic inflammatory disease included in the group of seronegative spondyloarthropathies that affects mainly the spine, with progressive rigidity and functional limitation. Patients with AS may require surgery of any type and these patients present specific challenges to the anaesthesiologist as a consequence of the potential difficult airway, neuraxial access, cardiovascular and respiratory complications. There is also an increased risk of neurological complications in the peri-operative period as surgical positioning of these patients under anaesthesia is also demanding due to risk of iatrogenic fractures and spinal cord trauma. Awake fibreoptic intubation is safest option in those patients with a potentially difficult airway as it allows continuous neurological monitoring while achieving a definitive airway . This article reviews the anaesthetic issues in patients with ankylosing spondylitis. The challenge to the anaesthetist is in the understanding of these issues so that appropriate management can be planned and undertaken.

KEYWORDS

Ankylosing Spondylitis, difficult airway, fiberoptic intubation

INTRODUCTION

Ankylosis spondylitis is an autoimmune seronegative spondyloarthropathy ,it's a complex potentially debilitating disease that is insidious in onset progressing to radiological sacroilitis over several years. It usually begins between the 2nd to the 4th decades of life, affecting mainly males (5:1) and HLA-B27 positive individuals. Ankylosing spondylitis can present significant challenges to the anaesthetist as a consequence of the potential difficult airway, cardiovascular and respiratory complications and the medications used to reduce pain and control the disease. There is also an increased risk of neurological complications in the peri-operative period.[1]

The stiffness of thoracic ribs results in ventilation being mainly diaphragm driven. Chronic spondylitis and ankylosis cause forward curvature of the thoracic spine, thus limiting breathing capacity . Patients with AS, who have cardiac and pulmonary disease, are therefore at increased anesthetic risk.[2]

Anaesthetic management must be planned case by case, which requires a combination of the knowledge, skills and judgment of the anaesthesiologist. However, it should be kept in mind that technical difficulties can also increase the risk of complications. Stiffness of the cervical spine, atlantooccipital, temporo-mandibular and cricoarytenoid joints may cause problems with tracheal intubation. AS is characterised by progressive ossification of joint cartilage and disc space which results in difficult spinal and epidural anaesthesia. Peripheral nerve block is a simple , safe and effective technique for peri-operative anaesthesia and with use of nerve stimulator.[3]

PATHOGENESIS

The initiating cause of AS is not known ,environmental factors (unidentified bacterial or viral agent) ,susceptibility genes HLA-B27 ,gender ,age and ethnicity play role ,sporadic AS more severe than familial[1]. Pathogenesis is immune mediated, but there is little direct evidence for antigen specific autoimmunity. The dramatic response of the disease to therapeutic blockade of tumour necrosis factor –alfa, cytokines plays important central role in the immunopathogenesis of AS.[4]

More recent evidence implicates the IL23/IL 17 Cytokine pathway ,IL23 leads to spontaneous infiltration in the enthes of CD 2+,CD 4- ,CD 8- bearing IL 23 receptors and producing IL 17 .The inflamed sacroiliac joint is infiltrated with CD4+ And CD8+,T cells and macrophages and shows high levels of TNF ALFA particularly early in the disease .New bone formation in AS appears to be largerly based on enchondral bone formation and occurs only in the periosteal compartment.[5]

CLINICAL FEATURES

The first symptoms of AS usually appear in late adolescence or early adulthood. The initial symptom is typically a dull pain that is insidious in onset , the pain is generally felt deep in the buttock and/or in the lower lumbar regions and is accompanied by morning stiffness in the same area that lasts for a few hours, improves with activity, and returns with inactivity.[4]

Systemic symptoms includes: Fatigue, Weight loss , Fever[4]

There are several extra-articular manifestations of AS:

1. Cardiovascular system
   Aortic regurgitation and insufficiency develops with fibrous proliferation of the intima and bundle branch block may develop because of involvement of purkinje fibres , necessitating aortic valve replacement or pacemaker insertion. May be associated with Myocarditis ,cardiomyopathy ,pericardial effusion.
2. Respiratory system
   Lung fibrosis is the most common pulmonary complication in AS, there is restricted movement of the costovertebral joints, which reduces vital capacity, and ventilation becomes progressively dependent on diaphragmatic function.
3. Central nervous system
   The most serious complication encountered in AS is spinal fracture. The cervical spine is the most susceptible site; fractures at this site can result in quadriplegia .Cauda equina syndrome, focal epilepsy, vertibrobasilar insufficiency, peripheral nerve lesions may be presentation in few cases.
4. Bones and joints affected

- Hip and shoulder joint arthritis
- Lumbar spine : Ankylosis leading to loss of lumbar lordosis
- Increased thoracic curvature –thoracic kyphosis
- Atlant- axial joint and atlanto -occipital subluxation
- TM joint involvement which causes limited mouth opening
- Costovertebral and costotransverse joint leading to limited chest expansion.

5. Ligaments tendons and fascia Enthsitis , Achilles tendonitis and plantar fasciitis.[1,5]

DIAGNOSIS

The diagnosis of AS is made on clinical and radiological criteria, There is no set of standard diagnostic criteria for AS. Sacroilitis, stiffness, positive familial history and radiological data are the most common indicator. Morning stiffness > 30 min, improvement in back pain with exercise but not rest, awakening because of back pain during the second half of the night only, and alternating buttock pain Modified New York criteria for As[1]

Diagnosis of AS requires one radiological criterion with at least one clinical criterion. Probable AS > 3 clinical criteria present or radiological criteria.

Clinical criteria
Low back pain > 3 months duration, improves with exercise and is not relieved by rest

Limitation of motion of the lumbar spine in sagital and coronal planes
Limitation of chest expansion relative to normal values corrected for age and sex.

Radiological criteria
Bilateral sacroilitis – grade 2 (sclerosis with some erosions)

higher Unilateral sacroilitis – grade 3 (severe erosions, pseudodilatation of joint space and partial ankylosis)

grade 4 (complete ankylosis)

Although no laboratory test is diagnostic of AS, the HLA-B27 gene is present in about 90–95% of patients with AS ,increased level of C reactive protein (CRP) and a raised erythrocyte sedimentation rate (ESR).A raised alkaline phosphatase level may be present in severe disease. Above normal serum IgA ,IL-23 and IL-17 levels are common.[2,7]

ANAESTHETIC IMPLICATIONS

PRE OPERARATIVE ASSESSMENT: A thorough pre-operative assessment is essential to evaluate the severity of the disease, in particular airway involvement and the extra-articular manifestations of the disease.[7]

History regarding duration of the disease –to know the severity of the disease and the medical line of therapy patient is to be documented.

AIRWAY ASSESSMENT

Criteria to predict difficult airway: Mallampatti classification, Wilson index ,thyromental distance ,sternomental distance ,degree of mouth opening for TM joint mobility to be noted [2,4].

Evaluation of neck mobility is mandatory which also includes cervical spine X –ray lateral and in maximal extension .Fixed cervical spine flexion chin on chest deformity documented during examination.

Pre operative documentation of neurological deficeit and extra articular manifestations

The range of movements of all the other joints should be assessed to plan optimal positioning during the procedures.

Attention should be given to gastric protection due to the routine use of non-steroidal antiinflammatory drugs (NSAIDS).[2]

INVESTIGATIONS

Routine blood investigation: CBC , RFT and serum electrolytes
Cardiologic evaluation: ECG- for any conduction defects , 2D ECHO- involvement of any heart valves especially aortic valve as sudden intense SVR variation not tolerated by patients caused by spinal anaesthesia.

Pulmonary function : CXR may show apical fibrosis, PFT-showing restrictive lung disease pattern.

Lumbar spine Xray: evaluate the possibility of central neuraxial blockade. lateral cervical spine x ray in full extension and flexion.
Pre operative laryngoscopy is a useful examination , reliable indicator of probable intubation difficulty from any cause.[8]

GENERALANAESTHESIA

AIRWAY MANAGEMENT

AS patients usually have no problem with mask ventilation, but most experience difficult laryngoscopy and intubation .Difficult intubation is associated with AS involving the cervical spine and can be compounded further when the temporomandibular joint is involved. The involvement of the temporomandibular joint limits mouth opening in up to 40% of the patients, which can evolve to complete ankylosis.

Neck movements in extension and flexion should be assessed by radiological screening. There is significant risk of neurological injury with any excessive neck extension in patients with chronic cervical kyphosis. Neck extension can cause vertebrobasilar insufficiency as a result of bony encroachment on the vertebral artery. Cervical support should be used during the procedure, especially if symptoms of vertebrobasilar insufficiency are present. Fixed cervical flexion deformities limit access to the trachea and tracheostomy may be impossible, an event of obstructive cervical osteophyte or severe cervical flexion deformity that prevents successful intubation.[9]

Once the difficulties for tracheal intubation are determined, the anesthesiologist should choose a method of intubation. Fibroscope guided intubation with mild sedation of the patient and anaesthesia of the mucous membranes is the method of choice in patients with advanced deformity of the cervical spine. Awake fibreoptic intubation is the safest option, especially in those patients where it is not possible to visualise the larynx on laryngoscopy or those with severe chin on chest deformity indirect Retrograde intubation may also be considered.

The intubating laryngeal mask (ILM) and the classic laryngeal mask have been used during failed intubations in AS patients as alternatives or aids to tracheal intubation in the anaesthetised patient, and for awake insertion. Various other approaches are available for securing the airway in patients with AS, including blind nasal intubation, fiberoptic bronchoscopy, lighted stylet intubation, Bullard laryngoscopy, retrograde intubation, intubating laryngeal mask airway, Glidescope and tracheostomy. If intubation fails, percutaneous transtracheal jet ventilation (PTJV) may be used as a rapid, effective means of achieving ventilation.[3]

POSITIONING OF THE PATIENT

There is an ever-present risk of spine fracture and cervical spine instability in these patients. In some patients with kyphotic deformities, the presence of a highly curved spine prohibits achievement of a free-hanging abdomen . If the abdomen is not supported, there is an increase in peak inspiratory pressure and ventilation problems. To compensate, generous additional padding may be used to relieve the pressure which cause a resultant increase in central venous pressure, leading to distension of the epidural venous plexus.

REGIONALANAESTHESIA

Spinal and epidural anaesthesia is technically difficult and may result in an increased risk of complication. However, epidural or spinal anaesthesia is an acceptable alternative to general anaesthesia in the presence of ankylosing spondylitis and perineal or lower limb surgery.
Subarachnoid block using a lateral approach has been advocated as an alternative when general anaesthesia is contraindicated. The placement of epidural anaesthesia is technically difficult and is associated with an increased risk of an epidural haematoma.[3]

If a central neuraxial blockade is chosen as the anaesthetic technique, likelihood of successful spinal anaesthesia seems higher than other neuraxial interventions. The epidural space is narrow in AS patients and local anaesthetic solutions should be administered slowly in small doses to avoid total spinal anaesthesia. Tracheal intubation may still be required, due to complication of epidural or spinal anaesthesia, such as intravenous injection of local anaesthetic or a very high block. Other predisposing factors included concurrent NSAID therapy and a narrow epidural space. Preoperative coagulation studies may be prudent in these patients.

Repeated neurological examination in these patients after neuraxial anaesthesia should be undertaken because they have an increased risk of developing a spinal haematoma . The cephalad spread of the neural blockade, produced by epidural or spinal techniques is a matter of concern because of unpredictable high motor blockade, which may affect innervations of the diaphragm and acute cardiovascular effects of sympathetic blockade.[16]

PERIPHERAL NERVE BLOCKS

Peripheral blocks are also difficult to perform due to the impossibility to position the patient adequately. For upper limb surgery, the axillary rather than inter-scalene blocks is sometimes preferred, when using regional techniques in the upper extremities.[4,16]

CONCLUSION

Patients with chronic spinal disease demand specific anaesthetic planning because they present an important challenge to the

anaesthesiologist: difficult airways, monitoring of neurological function by evoked potentials, positioning, and bleeding. General anaesthesia has been the technique of choice, even with difficult airways. The degree of cervical spine involvement will determine how difficult the tracheal intubation might be. Individualized pre-anaesthetic evaluation is fundamental, as well as the indication of the right anaesthetic technique to minimize morbidity when these patients undergo surgical or diagnostic procedures.[1]

REFERENCES

1) Woodward LJ, Kam PC. Ankylosing spondylitis: recent developments and anaesthetic implications. Anaesthesia. 2009 May 1;64(5):540-8.
2) Oliveira CR. Ankylosing spondylitis and anesthesia. Revista brasileira de anestesiologia. 2007 Apr;57(2):214-22.
3) Saringcarinkul A. Anesthetic considerations in severe Ankylosing spondylitis. Chiang Mai Medical Journal- . 2009;48(2):57-63.
4) Sieper J, Braun J, Rudwaleit M, Boonen A, Zink A. Ankylosing spondylitis: an overview. Annals of the rheumatic diseases. 2002 Nov 1;61(suppl 3):iii8-18
5) Harrisons Manual of Medicine, 19th Edition Dennis Kasper, Anthony Fauci, Stephen Hauser, Dan Longo.
6) Eipe N, Fossey S, Kingwell SP. Airway management in cervical spine ankylosing spondylitis: Between a rock and a hard place. Indian journal of anaesthesia. 2013 Nov;57(6):592
7) Kumar VS, Das SU, Sampath TS. A review on ankylosing spondylitis. Int J Pharm Bio Sci. 2011;2(3):187-93
8) Airway Management in a Patient with Severe Ankylosing Spondylitis Causing Bamboo Spine: Use of Aintree Intubation Catheter Muhammad Irfan Ul Haq, Faisal Shamim, Shankar Lal and Faraz Shafiq. Journal of the College of Physicians and Surgeons Pakistan 2015, Vol. 25(12): 900-90
9) Continuous posterior lumbar plexus and continuous parasacral and intubation with lighted stylet for ankylosing spondylitis-case report ; Anesthesia: Essays and Researches; 9(1); Jan-Apr 2015.
10) Kumar N, Bindra A, Mahajan C, Yadav N. Airway management in a patient of ankylosing spondylitis with traumatic cervical spine injury. Saudi journal of anaesthesia. 2015 Jul;9(3):327.
11) Karne V, Sadavarte N. Airway management in a patient with severe Ankylosing Spondylitis. Indian Journal of Basic and Applied Medical Research; June 2014: Vol.-3, Issue- 3, P. 251-255
12) Dave N, Sharma RK. Temporomandibular joint ankylosis in a case of ankylosing spondylitis—anaesthetic management. Indian J Anaesth. 2004 Jan 1;48(11):54-6.
13) Airway management in a patient of ankylosing spondylitis with traumatic cervical spine injury-case report; Vol. 9, Issue 3, July-September 2010.
14) Schelew BL, Vaghadia H. Ankylosing spondylitis and neuraxial anaesthesia — A 10 year review. Can J Anaesth 1996;43:65-8
15) Sciubba DM, Nelson C, Hsieh P, Gokaslan ZL, Ondra S, Bydon . Perioperative challenges in the surgical management of ankylosing spondylitis.
16) Hoh DJ, Khoueir P, Wang MY. Management of cervical deformity in ankylosing spondylitis.