Regional Anesthesia As An Individualized Approach For A Patient With Syringomyelia And Severe Pulmonary Hypertension Undergoing Surgery For Hip Fracture. A Case Report

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ABSTRACT

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Anaesthetic management of patients with comorbidities can be challenging and requires rigorous planning. Peripheral nerve blocks (PNBs) do not compromise haemodynamics or pulmonary function. We present the management of a patient with symptomatic syringomyelia, severe pulmonary hypertension, thrombophilia and obstructive sleep apnoea undergoing hip fixation. Combined psoas compartment and sciatic nerve block was conducted and the patient remained stable perioperatively. She had an uneventful recovery and was discharged three days later. Patients with multiple comorbidities are subject to high perioperative risk and should be managed individually. Regional anaesthesia can be a last resort that leads to a better outcome.

INTRODUCTION

A key element of daily anaesthetic practice is the delivery of safe anaesthesia. Anaesthetic management is tailored to the patient's status and preexisting diseases, the surgeon's needs and anaesthetic expertise. In case of an emergency plus high risk procedure emerging dilemmas necessitate expert consultation. This report presents a case of a patient with symptomatic syringomyelia, severe pulmonary hypertension (PH), thrombophilia and obstructive sleep apnoea (OSAS) who underwent hip fixation in our hospital. Each one of the aforementioned pathologies has specific anaesthetic considerations[1,2].

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CASE REPORT

The patient was a female in her late-50s with a Body Mass Index of 36 suffering a hip fracture.

Her medical history included congenital thrombophilia, Chronic Thromboembolic PH (CTEPH), syringomyelia and OSAS. Upon preoperative visit we assessed the history of preexisting diseases as well as her clinical status and classified her as ASA class IV. Congenital thrombophilia due to factor II mutation complicated with Deep Venous Thrombosis at her mid-40s and multiple episodes of pulmonary emboli the subsequent years. These resulted in severe CTEPH and class IV functional capacity. It was characterized inoperable, balloon pulmonary angioplasty was conducted and she was listed for lung transplantation. According to a right catheterization three months prior to admission mean pulmonary artery pressure was 63mmHg and Pulmonary Vascular Resistance was 15.7 Woods. The past two years syringomyelia of T10-T11 became symptomatic leading to instability and a fall which led to a T11-12 fracture. Notably, surgical management was considered prohibitive due to her condition. A CPAP mask was used during sleep to prevent apnoea episodes. Her examination revealed hypoxemia in room air and supplemental oxygen was provided. Acenocoumarol was substituted with LMWH according to cardiologist's recommendation. Her medication also included spironolactone, furosemide, amiloride riociguat, ambrisentan and treprostinil as continuous subcutaneous infusion. Targeted medication for PH was continued perioperatively. After counselling with all relevant specialties – anaesthesiologists, orthopaedics, cardiologists and pulmonologists – it was decided that general anaesthesia should be best avoided, neuraxial anaesthesia was contraindicated and the only plausible plan would be a peripheral nerve block. Informed written consent was obtained.

Standard monitoring plus an arterial line were placed and a psoas compartment block along with sciatic nerve block successfully conducted on her third day of hospitalization by an expert anaesthesiologist. The patient was placed in the lateral position with the side to be anaesthetized facing up. A low frequency curved linear ultrasound transducer was used. With the psoas muscle anteriorly, the erector spinae muscle posteriorly and the quadratus lumborum muscle situated at the apex of the L4 transverse process, a well recognizable pattern of a shamrock with three leaves can be seen. Hyperechoic round oval structures representing the nerves of the lumbar plexus are found in the medial and posterior part of the psoas muscle. The sciatic nerve deep to the gluteus maximus muscle was found just lateral to the origin of the biceps femoris muscle at the ischial tuberosity.

As we used the dual guidance technique a nerve stimulator (B Braun Stimuplex HNS 12) was also placed. A total dose of 28ml Ropivacaine 0,5% were injected with negative aspiration test for psoas compartment and sciatic block after proper muscle response. The patient also received intravenous two mg of midazolam in order to feel relaxed during the operation. The

patient was haemodynamically stable and the surgery lasted 45 minutes. Intensive Care Unit hospitalization was unnecessary and she was transferred to the orthopaedics ward. Overall, she had an uneventful course and was discharged three days later.

DISCUSSION

Emergency cases overall are characterized by increased morbidity and mortality. There is no consensus regarding anaesthetic management of syringomyelia. However, spinal or epidural anaesthesia is only supported by case reports in asymptomatic, mainly obstetric, patients. Advocators of general anaesthesia argue that cerebrospinal fluid fluctuations and ICP elevations may be hazardous for these patients but warn regarding the use of non-depolarizing agents[3-5]. Currently, there are no guidelines considering perioperative management of patients suffering from pulmonary hypertension. A recent review of perioperative care of these patients reported a 24 – 42% frequency of serious complications[6]. Ramakrishna et al. retrospectively studied 145 patients with PH who underwent non cardiac operation with general anaesthesia and identified that history of pulmonary embolism, New York Heart Association functional capacity ≥2, intermediate or high risk procedure and duration greater than three hours are all independent factors predicting adverse outcomes ($p<0,05$)[7]. In another retrospective study of 62 patients, anaesthetic technique did not significantly affect intraoperative complications occurrence. However, no patient was operated under regional anaesthesia with peripheral nerve block[8]. The lack of large scale homogenous trials precludes the recommendation of a single anaesthetic choice over the other[9]. The European Society of Cardiology and the European Respiratory Society recommend (class IIa, C) that for elective cases epidural is preferred over general anaesthesia[10]. Regarding OSAS, the Society of Anesthesia and Sleep Medicine strongly recommends that general anaesthesia should be avoided when possible. Regional anaesthesia techniques are favored for OSAS considering anaesthetic agent susceptibility of these patients[2]. Taking into account the clinical status of our patient, spinal or epidural anaesthesia are excluded considering the sympathetic blockade produced by the block. The resolution of vasodilation and subsequent preload increase could compromise the haemodynamic status and even lead to acute decompensation after the block resolves. Furthermore, these techniques entail intervention in the pathologic spinal canal while preexisting neurologic deficits could not be reliably documented because of the immobility of the patient. It is worth mentioning that our patient refused general anaesthesia according to her attending physician's counselling and her previous experience, when management of her T11-12 fracture was conservative due to her high perioperative risk. Even subtle cardiovascular chang-

es such as intubation stress could exacerbate pathophysiologic pathways and result in right ventricle failure or ischemia[11]. Weighing both potential benefit and risks, peripheral nerve blocks can be performed in patients with preexisting neurologic deficit provided that informed consent has been acquired[12]. The major advantage of PNBs is hemodynamic stability and avoidance of body fluids derangements[13]. In this patient, psoas compartment block and sciatic nerve block provided us the choice not to interfere with the complex balance of her conditions. This high risk procedure with major intraoperative and postoperative complications was conducted uneventfully with evident patient satisfaction. Design of a trial on perioperative course of these high risk patients with PNBs would provide anaesthesiologists with solid data to promote peripheral anaesthetic techniques.

CONCLUSION

In conclusion, psoas compartment nerve block combined with sciatic nerve block is a viable alternative for high risk patients undergoing this type of surgery.

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