

Anesthesia Management of Patients with Mental Retardation

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Abstract

Mental retardation is a condition likely to develop secondarily to several genetic diseases or to some negative conditions and diseases that occur before, during or after birth. Anaesthetic practices start with the preoperative visit of a patient and are then followed by premedication, preoperative preparation, intraoperative procedures and postoperative periods. All these steps with mentally retarded patients involve separate characteristics. The MR patients must be kept under observation in the recovery rooms for longer periods of time and must also be definitely re-evaluated by an experienced anaesthetist before being transferred to the service department. Since there may be several challenges/difficulties likely to be experienced at each stage of the mentally retarded patients' anaesthesia, far more care and patience is required. A pre-anaesthetic evaluation involving a physical examination in depth and a detailed questioning should be performed. During the pre-medication period, a little amount of midazolam mixed with a proper drink can be used. Prior to applying the neuromuscle blocking agents, the airway opening must be maintained. In the presence of muscular dystrophies, the doses of neuromuscular blocking agents must be equalized. The MR patients must be kept under observation in the recovery rooms for longer periods of time and must also be definitely re-evaluated by an experienced anaesthetist before being transferred to the service department.

Key words: Anesthesia management, Mental retardation, Intelligence quotient

Introduction

The patients with mental retardation have a special place in anesthetic management. Mentally retarded patients might be seen at both operation rooms and outpatient anesthesia managements. There are a limited number of data in the literature about the anesthetic management of mentally retarded patients. We think this article would be helpful for recognition of mental retardation.

Definition and Classification: Mental retardation (MR) is a condition likely to develop secondarily to several genetic diseases or to some negative conditions and diseases that occur before, during or after birth. According to the data of The World Health Organization (WHO), 3% of the world's population consists of mentally retarded people at various levels. Patients usually show themselves with intellectual deficiencies (ID), retardation in mentality and social inadaptability. Such disorders may develop in association with the exposure of the intrauterine to toxic substances, infections experienced during the gestational period, problems faced at the time of birth, or a trauma, infection or other diseases experienced in any period after birth/delivery (1).

Mental retardation is defined according to the Intelligence Quotient (IQ) scores, or by being categorized with the terms like trainable, educable and totally in need of care (Table 1). Despite this, dealing with each individual and caring for them with the help of an independent evaluation in the classification process would be a better and more accurate approach (2)

Anaesthesia: Anaesthetic practices start with the preoperative visit of a patient and are then followed by premedication, preoperative preparation, intraoperative procedures and postoperative periods. At each step of these procedures, the patient and patient relatives must be informed about the processes to take place and the complications that may occur (3). All these steps with mentally retarded patients involve separate characteristics.

Preoperative visit comprises the steps, such as the specification of the drugs used by the patient, previously-undergone operations, whether or not the patient has a medical record as to allergy or intubation difficulty, etc., physical examination, consultations to be performed by the involved branches and determining the method of anaesthesia (4,5).

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Table 1. DSM-IV classification of Mentally Retarded patients according to their IQ level (1)

IQ of 100 and above	Normal
IQ is between 70-100	Dull normal
IQ is between 50-70	Mild mental retardation (trained)
IQ is between 40-50	Moderate mental retardation (taught)
IQ is between 25-40	Severe mental retardation (partially trained)
IQ below 25	Heavy mental retardation (total care is required)

These patients in question are generally syndromic ones. Therefore, in addition to MR, there are also comorbid (additional) diseases in these patients as part of these syndromes. This condition must be taken into consideration during the preoperative preparation period. Unfortunately, such a process could be rather challenging for these patients due to cooperation and communication disorders. The role of the family is of great importance in taking the medical history of these patients.

During the examination of the patient, the physician should be quite patient. Under the circumstances in which the physician's patience is challenged or there is a rather limited time, the systemic examination should be left to the consulting physicians and proper conditions and platforms should be observed.

In a MR-syndromic patient, the fact that cardiovascular and craniofacial abnormalities likely to cause difficulty in maintaining the airways/breathing, disorders in the endocrine and electrolyte balance, and musculoskeletal anomalies may occur must be kept in mind and an in-depth analysis and necessary consultations related to the involved branch should also be performed. Separately, it must also be kept in mind that in the diseases like Rett syndrome accompanied by MR, the risk of developing an intraoperative malignant hyperthermia is higher than the other patients, according to which the preoperative preparations must be carefully planned (6-9).

One of the most important parts of the pre-anaesthetic examination is the evaluation of the airways. In this patient population, the possibility to encounter such conditions as the worst Mallampati score that complicates intubation, thyromental distance, extension difficulty of the head and micrognathia is higher when compared with those in the normal patient population (3).

While determining the method of anaesthesia in the patients with MR, the type of the surgery, the mental retardation degree of the patient and the requests of the patient and patient relatives should be taken into consideration. In MR patients, it is hard to apply the regional anaesthetic techniques and ensure the adaptation of the patient in the course of the operation. For such reasons, selecting one of the general anaesthetic methods in these patients would be a far better approach (10).

Premedication provides serenity, mental comfort, euphoria and a slumber by eliminating the fear, anxiety and excitement in MR patients. Separately, the pressure of the undesired reflex actions, such as preoperative nausea, cardiac dysrhythmia and laryngospasm reduce the necessary anaesthetic dose by decreasing the metabolic activity and eventually allow for a calm waking up and comfortable recovery as well as minimizing the secretions in the respiratory tract and ensures avoiding toxic doses by diminishing the local anaesthetic requirement (5).

The preferable way in applying the drugs for premedication in these patients is the intake. In mentally retarded patients difficult to be persuaded to take drugs orally, the intramuscular way or intravenous ways could be used. (10).

For this purpose, hypnotic sedatives, tranquilizers and narcotic analgesic anxiolytics are used. Apart from this, antihistaminics are also benefited from in order to maintain a sedative effect. Antiemetics, anticholinergics, antacids and H₂ receptor blockers can also be used in premedication. One of the most applied and recommended agents used for the purpose of sedation is midazolam (0.1-0.2 mg/kg).

Another agent or agents like Ketamine can be added to Midazolam, as well. (11). In the patients unable to be convinced to take the drugs orally, neurolept analgesia agents like Ketamine (5-12 mg/kg) or haloperidol, droperidol (2-2.5 mg) can also be preferred (10).

In MR patients, in order to boost the adaptation of the patient to the hospital, premedication could be provided in the patient's home prior to visiting the hospital.

Chan et al. had practised premedication on a 36-year-old MR patient with Down and Treacher-Collins syndrome in his house to avoid any aggressive attitudes before being taken to the hospital. To that end, 10 mg of lorazepam and 1000 mg of ketamine were added into the milk to be given to the patient orally and hence, the sedation was ensured. Thus, the preparations for teeth and ear surgery to be performed in the hospital were made safely (12).

However, such sort of a practice is not that common since the follow-up would be rather difficult at home and as these patients may have comorbid/additional pathologies, as well, and the risks likely to be confronted may be more than expected.

Table 2. Some drug using in sedation (14-17). *nasal dose

	Oral	Rectal	Intravenous (IV)	Intramuscular (IM)
Midazolam (mg/kg)	0.2-0.3*	0.05-0.5	0.01-0.1	0.07-0.15
Propofol (mg/kg)	-	-	1,5-2,5	-
Fentanyl (µg/kg)	-	-	0,5-1,5	50-100
Ketamine(mg/kg)	3-10	-	0,2-0,8	2-4

We did not come across a similar practice in the literature, either.

In MR patients, apart from the operating room, anaesthetics are most frequently required in the magnetic resonance imaging process. Due to the fact that the procedure in the magnetic resonance imaging takes a long time and is rather noisy besides the fact that the patient has to totally stay motionless throughout the process, anaesthesia is a mandatory optional way in this respect.

Throughout the procedure, a deep sedation, a rapid recovery and providing patient security are essential. Different methods of sedation can be used to that end (Table 2). Performing a premedication on MR patients in a convenient atmosphere will boost the patient adaptation prior to being taken to the magnetic resonance imaging unit. In the centers where there are no recovery units, the whole team should be quite patient, and patient security must never be risked just to save time (13).

Peri-operative Preparation: Before the MR patients are brought into the operating room, difficult airway instruments, vascular accesses, the fluids to be transferred to the patient, including the induction drugs must all be ready along with all the preparations made. Hence, the unnecessary loss of time must be avoided prior to induction after the patient has been taken onto the operating table. The patient taken into the operating room is now sedated, peaceful or sleepy.

After the routine monitorization of the patient brought to the operating table (electrocardiography, non-invasive tension arterial and peripheral oxygen saturation), a preoxygenation with a mask is performed. The preoxygenation in particular is of great importance in these patients, since anaesthesia will allow for an extra period of time in order to cope with the airway problems likely to occur in the wake of induction.

Apart from the additional monitorization that may be required during the surgical procedure in MR patients, there is no other additional procedure to be performed. For the sake of avoiding the unnecessary use of agents during the intraoperative period, and again, for avoiding wakefulness and for the standardization of the anaesthetic depth, a bispectral index monitorization and follow-up can be performed.

However, in a study conducted by Ponnudurai et al. in 2010, it was put forward that no difference was observed in terms of the bispectral index among the groups during the intraoperative period (18).

IV method is preferred for induction in the patients accepting to have their sedation level vascular access established.

On the other hand, the inhalation anaesthetics can be preferred for induction in the patients whose vascular accesses cannot be established. Sevoflurane can be used to that end. Sevoflurane becomes prominent in induction when compared to the other inhalation agents due to its fast effects and nice aroma as well as having no irritant effect on the airways. For this purpose, 4-8% sevoflurane and 50% of oxygen/nitrogen mixture can be performed.

There are various options for the IV general anaesthetic agent following the induction through the inhalation anaesthetics. Among these are propofol (1.5-3 mg/kg), thiopental (4-7 mg/kg), ketamine (1-2mg/kg), and etomidate (0.3-0.5mg/kg).

It must always be kept in mind that of these agents, ketamine must be very carefully used in the patients with intracranial pressure increase, while thiopental must be carefully used in those in hypotensive shock, and etomidate must be very carefully used in the patients with a medical record of epileptic seizure (1,5).

As for the narcotic analgesics, there is no different condition in the MR patients compared to the other patient populations. Prior to preparing the muscle-relaxing agent, the fact that the openness of the patient's airways could be ensured must be verified and the difficult airway must be excluded. For this purpose, in the wake of the induction of the general anaesthetic agent, the Cormack Classification involving laryngoscopy and epiglottis and the inspection of the vocal cords must be rapidly performed. After having determined that there is no problem for intubation, muscle relaxants can be made (19).

Almost one fourth of the patients with mental retardation have a medical record of epileptic seizure (20). Due to the anti-epileptics used for a long time by the patients, the patients' susceptibility to the drugs metabolized due to the liver enzyme induction may have diminished.

For this reason, it must be particularly kept in mind that there may be a little nonsusceptibility to the non-depolarizing neuromuscular blocking agents of steroid structure, and the dose adjustment must be performed if required.

The depolarizing neuromuscular blocking agents must not be used in the case of muscular dystrophias that accompanies the MR patients more

frequently than the normal patient populations. Much care must be taken in the cannulation procedures required during the perioperative period.

In another study conducted by Sulemanji et al. (21). in 2009 on the cannulation of pediatric patients, where two patient populations- one with Down syndrome and one without Down syndrome- who had undergone a cardiac surgery were compared, it was stated that the arterial and venous cannulation in the population with the Down syndrome had been more challenging. In MR patients, the ultrasonography can be used for the purpose of noticing the anatomic variations during the central venous cannulation as well as the ease of procedures and avoidance of complications.

Recovery: In the recovery rooms, the MR patients pose a problem all by themselves. The limited number of health personnel in charge of these units and the challenge to take simultaneous care of more than one patient can cause some deficits in the necessary care and patience to be shown to these types of patients. The standard measurements/assessments that we use while evaluating the airway reflexes of the normal patients, such as opening the mouth and keeping it open, raising the head, and shaking hands, may not be used so often in this patient population in question. Instead, the patients must be kept under observation for longer periods of time and be referred to the involved service department to have their adequate muscle activities and the presence of their respiratory capacity observed. The patient should be re-evaluated by an experienced anaesthetist before leaving the recovery room (22).

Conclusion

In summary, since there may be several challenges/difficulties likely to be experienced at each stage of the mentally retarded patients' anaesthesia, far more care and patience is required. A pre-anaesthetic evaluation involving a physical examination in depth and a detailed questioning should be performed.

During the pre-medication period, a little amount of midazolam mixed with a proper drink can be used. The anaesthesia induction can be provided with the help of one of the inhalation anaesthetics, sevoflurane. Prior to applying the neuromuscle blocking agents, the airway opening must be maintained. In the presence of muscular dystrophies, the doses of neuromuscular blocking agents must be equalized.

Ultrasonography can be used in the course of the interventional procedures. The MR patients must be kept under observation in the recovery rooms for longer periods of time and must also be definitely re-evaluated by an experienced anaesthetist before being transferred to the service department

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