

Anesthesia for intellectually disabled

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Abstract

Anesthetizing an intellectually disabled patient is a challenge due to lack of cognition and communication which makes perioperative evaluation difficult. The presence of associated medical problems and lack of cooperation further complicates the anesthetic technique. An online literature search was performed using keywords anesthesia, intellectually disabled, and mentally retarded and relevant articles were included for review. There is scarcity of literature dealing with intellectually disabled patients. The present review highlights the anesthetic challenges, their relevant evidence-based management, and the role of caretakers in the perioperative period. Proper understanding of the associated problems along with a considerate and unhurried approach are the essentials of anesthetic management of these patients.

Keywords: Anesthesia, disabled, intellectually

Introduction

Intellectual disability (ID) or general learning disability or formerly known as mental retardation is a generalized disorder characterized by significantly impaired cognitive function along with deficits in two or more adaptive behaviors or functional skills.^[1] ID patients are unable to comprehend the purpose of any medical procedure which makes it difficult for the medical staff to obtain their active cooperation. Moreover, any unpleasant or painful procedure may trigger combative and aggressive behavior. Thus, the anesthetic management of ID patients is challenging. This review identifies the anesthetic considerations and their optimal management.

Methodology

An online literature search was performed using keywords anesthesia, intellectually disabled, and mentally retarded.

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The various engines searched were PubMed, NIH.gov, ScienceDirect, and Google.com. The relevant articles were included for the purpose of review. A manual search of references from relevant articles was also carried out, and various textbooks of anesthesiology were reviewed for relevant literature.

Definition and Diagnosis of Intellectual Disability

ID involves impairment of cognition and adaptive/functional skills. According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders,^[2] three criteria must be met for diagnosis of ID:

- Intellectual functioning deficit
- Significant limitations in adaptive functioning
- Evidence that the limitations became apparent during the developmental period (childhood or adolescence).

Intellectual functioning deficit includes deficit in various mental abilities such as reasoning; problem-solving; planning; abstract

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thinking; judgment; academic learning; and experiential learning. Intellectual functioning deficit is measured and classified [Table 1] by intelligence quotient (IQ). IQ is calculated as: Mental age \times 100/chronological age. Limitations in adaptive functioning are measured using various tests such as Woodcock–Johnson scales of independent behavior and Vineland adaptive behavior scale.^[2]

Incidence and Causes

ID patients comprise 2%–3% of the general population. Among children, the cause [Table 2] is unknown for one-third to one-half of cases.^[3] About a quarter of cases are caused by a genetic disorder.^[3] The three most common inborn causes associated are Down syndrome, velocardiofacial syndrome, and fetal alcohol syndrome.^[3]

Indications for Anesthesia

About 30%–40% ID patients may present to anesthesiologist for various diagnostic and therapeutic outpatient procedures or for surgical in-patient procedures [Table 3]. Majority of the literature relates to diagnostic, dental and corrective surgeries.

Preoperative Anesthetic Concerns

The challenges when facing ID patients are related to patient as well as the parents. The major preoperative concerns related to ID patients are:

1. Lack of communication and cooperation:^[9,10] The anesthesiologist has to depend on caretakers for patient's medical, allergic, past surgical, and previous anesthesia exposure history of there may be related or unrelated disease process that may go unrecognized due to difficulty in communication.^[10] Undertaking simple routine investigation may also be difficult. Hence, routinely hemogram, urine routine, and microscopy are being ordered. Specific investigations such as chest X-ray, electrocardiogram (ECG), echocardiogram, computed tomography, and magnetic resonance imaging are ordered according to the system involved^[10]
2. Assessment/evaluation of associated congenital anomalies and medical problems:^[11] Cardiac anomalies such as atrial septal defect, ventricular septal defect, patent ductus arteriosus, coarctation of aorta, and conduction defects can be associated. Patients with associated neuromuscular disease may have a history of aspiration and repeated chest infection.^[12] Deformed vertebrae and ribs, craniofacial dysmorphias, neurological dysfunction, dermatographic, urogenital, visceral, and ocular abnormalities can be seen. Nutritional imbalances may also be seen

Table 1: Classification of intellectual disability patient

Degree of ID	IQ
Mild	50-69
Moderate	35-49
Severe	20-34
Profound	<20

IQ = Intelligence quotient, ID = Intellectual disability

Table 2: Causes of Intellectual disability

Cause	Example of conditions
Genetic conditions ^[4-6]	Down syndrome
	Klinefelter's syndrome
	Fragile X syndrome (common among boys)
	Neurofibromatosis
	Congenital hypothyroidism
	William's syndrome
	Phenylketonuria
	Prader–Willi syndrome
	Phelan–McDermid syndrome (22q13del)
	Mowat–Wilson syndrome
	Genetic ciliopathy
	Siderius type X-linked mental retardation
Maternal causes	Maternal alcohol intake
	Infections like rubella
Perinatal causes	Fetal hypoxia during labor
	Cerebral palsy
Infections	Whooping cough, measles, meningitis
Toxins	Lead, mercury
Iodine deficiency states ^[7]	
Malnutrition ^[8]	

Table 3: Various anesthetic procedures for which intellectually disabled patients may present

Diagnostic/therapeutic	Surgical
CT scan	Dental and oral surgery
MRI scan	Plastic surgery
Electroconvulsive therapy	Orthognathic surgery
Ryle's tube insertion	Ocular surgery
	Cardiac surgery
	Corrective surgeries for congenital malformations, e.g., cleft lip/palate
	Obstetric or gynecological surgeries

MRI = Magnetic resonance imaging, CT = Computed tomography

3. Difficulty in airway assessment: Airway assessment may be difficult because of lack of cooperation, upper extremity or neck contracture, drooling of saliva, dental malocclusion, and repeated tongue thrusting in patients with bulbar involvement. The paramount importance should be given to airway examination as these patients can have micrognathia and microcephaly, short neck, truncal obesity, cervical spine abnormalities, and subglottic stenosis. Macroglossia, hypoplasticity of the

maxilla/mandible, palatal abnormalities, and mandibular protrusion are the usual airway abnormalities encountered in ID patients with Down syndrome.^[13] A review of previous anesthetic records is indispensable when planning airway management.^[13]

4. Consent and preoperative care issues: Consent is given by relative irrespective of the age. They have to be given instructions regarding preoperative fasting, the necessity of giving regular medications, and to notify the hospital of any change in health and treatment.^[10] Compliance of instructions by the caretakers is very important in the management of these patients.

The challenges faced by the parents/caretakers, like no cure for disability, depending on relatives or caretakers for basic needs, lifelong learning process, repeated injuries, and associated medical problems,^[11] affect their psychology to a large extent. It is appropriate to show appreciation of the position of the families and try to establish communication with them along with the patient. Proper counseling and care of aggrieved parents/caretakers forms an equally important part of the management of ID patients and helps in developing confidence and good rapport.

Anesthetic Techniques and Management

The various anesthetic techniques such as sedation, general anesthesia (GA), or regional anesthesia (RA) have their own specific perioperative concerns which make each of these techniques demanding in these patients [Table 4]. Lack of patient cooperation, impaired cognition, and communication are the common problems. This may result in difficult intravenous (IV) line insertion and placement of monitors before any anesthetic technique.

Sedation

Sedation is an effective and safe alternative to GA, especially in patients with medical comorbidities. A severely ID patient may not be able to understand or cooperate with the need to breathe continuously through the nose which is a requirement of inhalation sedation.^[14] Verbal communication may not be possible as a clinical sign of conscious sedation during IV sedation.^[14]

Various pharmacological combinations have been used for sedation in these patients. A combination of IV drugs (diazepam/midazolam, and meperidine/pentazocine) and in some cases a combination of IV drugs with intramuscular (IM) midazolam plus meperidine has been used.^[15] Oral ketamine has been successfully used in uncooperative ID patients.^[16] Combinations of oral meperidine and promethazine with inhalation nitrous oxide/oxygen sedation^[17] and a combination

Table 4: Anesthetic technique and perioperative concerns

Sedation techniques	
Inability to understand or cooperate with the need to breathe continuously through the nose	
Verbal communication may not be possible as a clinical sign of conscious sedation	
GA-intraoperative	
Drug interaction of antipsychotic and antiepileptic drugs with anesthetic agents	
Airway difficulties	
Comorbidities affect drug dosing and choice	
GA-postoperative	
Assessment of a recovery can be difficult	
Postoperative delirium	
Compliance with incentive spirometry and early ambulation may be difficult because of fear, distress, and communication problems	
Postoperative ulcers	
Risk for dehydration and secondary infections	
Regional	
Patient acceptance and cooperation	
Inability to comprehend the regional anesthesia technique and its requirements	
Difficulty in maintaining the position for regional technique	
Difficulty in assessment of block	

GA = General anesthesia

of propofol by continuous infusion and midazolam bolus have also been used.^[18]

General anesthesia

GA is necessary for only a small percentage of ID patients with: (1) the presence of a severe management problems which are not amenable to the use of sedation and/or restraints, (2) a large or extensive amount of treatment needed, and (3) large physical size of the ID patient.^[19]

Besides the challenges faced by anesthesiologist, GA has been found to have a beneficial effect in these patients as demonstrated by a positive behavior at subsequent recall appointments when compared to patients who were treated under conscious sedation.^[20]

Premedication

The majority of patients suffer from additional diseases. The medications to manage medical problems and to control behavior must be continued till the morning of surgery.^[12]

It may be difficult to secure IV access or transfer ID patients from ward to operation room (OR). This makes premedication essential. In such patients, IM ketamine up to 12 mg/kg or oral ketamine 0.5–8 mg/kg might help in securing an IV access.^[21,22] Oral midazolam 0.5 mg/kg can provide sufficient preoperative amnesia and sedation,^[23,24] and children can be easily separated from their parents within 10–20 min without prolonging discharge time.

ID patients may be particularly sensitive to the depressant effects of sedative-hypnotic agents. The parents or caretaker should be consulted regarding the patient's tolerance to previous premedication. Vigilant observation with continuous pulse oximetry should accompany any premedication.

Special situations

Cerebral palsy

Patients with cerebral palsy (CP) may have decreased airway tone, generalized hypotonia, gastrointestinal reflux, and impaired pharyngeal function with pooling of oral secretions which can increase the risk of aspiration. These require administration of antireflux agents, antacids, and anticholinergics.^[13]

Down syndrome

These patients show markedly increased (twice normal or greater) sensitivity to the cardio accelerator effects of atropine.^[25] This mandates caution when using atropine as a premedication and is better avoided nowadays.

Epileptic patient

Diazepam, an enzyme inhibitor, should be cautiously used in epileptic patient with ID taking phenytoin as it can lead to phenytoin toxicity.^[26]

Intraoperative

Intravenous access and monitoring

It is advisable that IV access may be secured before bringing the patient in OR. An appropriate premedication, considerate approach, and guardian presence help in calming ID patient and ease placement of IV access and monitors before induction.

Intraoperative monitoring must include at least the standard basic American Society of Anesthesiologists (ASA) monitoring which includes the presence of a qualified anesthesiologist in OR throughout the conduct of anesthesia and continuous evaluation of:^[27]

- **Oxygenation:** Using pulse oximetry and constant evaluation of color in adequate illumination; inspired oxygen concentration using an oxygen analyzer during GA using an anesthesia machine
 - **Ventilation:** Clinical adequacy adjudged by chest excursions, reservoir breathing bag movements, and auscultation of breath sounds continuously; quantitative end-tidal carbon dioxide (ETCO₂) measurement in patients with definitive airway under GA; and correct positioning of the definitive airway verified by clinical assessment and ETCO₂
- The adequacy of ventilation shall be evaluated by continual observation of qualitative clinical signs during

regional or local anesthesia without sedation, and both qualitative clinical signs and ETCO₂ during moderate or deep sedation

- **Circulation:** Continuous ECG monitoring; blood pressure and heart rate
In addition to the above, all patients receiving GA should have a continuous evaluation of circulatory function by either: Palpation of pulse, or auscultation of heart sounds, or intraarterial pressure tracing, or pulse oximetry
- **Temperature:** Nasopharyngeal or axillary temperature probe when clinically significant changes in body temperature are intended anticipated or suspected
Neuromuscular monitoring should be used wherever applicable. Invasive monitoring may be used in patients with associated cardiovascular co-morbidity, if applicable.

Induction

A calm, unhurried approach in the presence of a familiar person is beneficial. Appropriate attention should be given to the interactions of anesthetic drugs with the psychostimulants, anticonvulsants, antipsychotics, and antidepressant medications these patients may be on.^[10]

Patients may have an IV induction of GA if IV line is in place. The induction agents commonly used are thiopental and propofol with small doses of the benzodiazepines such as diazepam or midazolam. Opioids such as fentanyl 0.5–1.5 µg/kg or alfentanil 25–50 µg/kg can also be added in small doses. Thiopental 2.5–4 mg/kg and methohexital 1–1.5 mg/kg are the successfully used barbiturates. Methohexital may occasionally cause involuntary movement, so thiopentone is routinely used.^[12] Propofol is usually given 1.5–3 mg/kg IV mixed with 20–30 mg of lidocaine to minimize pain on injection.^[12] It is devoid of major side effects, causes minimal postoperative nausea and vomiting (PONV), and patients recover rapidly. It appears to be a safe and effective agent in ID children and other high-risk patients in whom GA carries increased risk.^[28] Oral, IM, or IV ketamine can be used as a primary agent to facilitate induction in combative patients.^[21] However, dissociative emergence and unpredictable recovery profile preclude its use in ID patient.^[12]

In patients without IV line preoperatively, IM ketamine induction outside the OR or inhalational induction with N₂O, O₂, and vapor anesthetic (halothane/sevoflurane) in the OR may be used. Halothane should be given cautiously to patients receiving phenytoin as it may impair its hepatic metabolism and resultant elevated plasma levels or toxicity.^[29] Sevoflurane is nowadays more commonly used as it has a faster induction, shorter recovery period, and no systemic alterations.^[30]

Special situation

Cerebral palsy

Frei *et al.* observed 20% lower minimum alveolar concentration for halothane in patients of CP with ID^[31] and further reduction by 10% in patients taking anticonvulsants.^[31] Bispectral index score for sevoflurane was also found to be low in CP patients in comparison to other patients when administered at the same concentration.^[32] The postulated cause was that the underlying disease itself causes decreased pain perception or disturbed neuronal interaction at spinal cord or drug interaction by anticonvulsant use.^[31]

Airway management

Difficulties during airway management may be due to complete lack of cooperation, craniofacial abnormalities associated with some genetic syndromes, obesity, limited neck mobility or neck instability, and frequent respiratory tract disease. While obvious predictors as above help anticipate difficult airway, possibility of unanticipated difficult airway should always be considered when managing such patients. Difficult airway cart should be kept ready in all cases. A concern peculiar to airway management of almost all ID patients is the lack of cooperation and inability to use the awake limb of ASA difficult airway algorithm.^[33] Based on syndrome association, there may be added problems of difficult mask ventilation, supraglottic placement laryngoscopy/intubation, and surgical access. Video laryngoscopes may be a useful option as these do not require alignment of oropharyngolaryngeal axis. However, data regarding their use in ID patients are lacking. Tracheal intubation through supraglottic airway devices may be another option. Various techniques of either blind or fiber optic-guided intubation through supraglottic devices such as intubating laryngeal mask airway (LMA), ProSeal LMA, and i-gel have been described.^[34-37]

Oxygenation should be ensured while managing airway. Preoxygenation should be considered in all ID patients. However, preoxygenation itself may be challenging in most ID patients. Supplemental oxygen delivery should be ensured throughout the process of airway management.^[33]

Extubation after surgery may pose challenges even in patients with normal intubation as there may be difficulty in the assessment of the awake status. Planning and preparation should be given due importance in line with the Difficult Airway Society Extubation Guidelines.^[38] Laryngeal mask exchange and the airway exchange catheter should be available for managing especially the 'at risk' ID patients. Postextubation care should form an integral part of the extubation process and should not be neglected.^[38]

Maintenance of anesthesia

The patient can be maintained on either propofol infusion or inhalational agent. Earlier eye opening was observed with propofol maintenance when compared to isoflurane.^[39] Propofol maintenance is also advantageous as it requires less recovery room monitoring, earlier discharge with resultant reduced costs.^[39,40] In addition, the PONV risk is reduced in comparison to sevoflurane.^[41]

In patients with rare syndromes, responses to anesthetic drugs are not known. Furthermore, many of the patients may be on multiple medications with multiple allergies. Use of same volatile agent for inhalational induction, intubation under deep inhalation anesthesia, and maintenance may be used with an aim to use the minimum number of drugs and minimize drug interactions.^[10]

Neuromuscular blockade and reversal

The use of neuromuscular blockers during anesthetic induction should be avoided due to the risk of unpredictable airway problems. Induction with 8% sevoflurane plus remifentanyl 1–2 ug/kg produces optimal tracheal intubation conditions without the need for neuromuscular blockers.^[42]

Trachea should be extubated after reversal of muscle relaxation when the protective reflexes have returned.^[12,39] After ascertaining adequacy of recovery, patients should be shifted to postoperative ward with minimum monitoring in terms of monitors and personal.

Special situations

Cerebral palsy

An increased response to succinylcholine and resistance to nondepolarizing muscle relaxants (NDMR) is observed due to extrajunctional acetylcholine receptors.^[43,44] Since the suggested site of action of phenytoin is prejunctional, an increased sensitivity to NDMR in patients receiving phenytoin is observed because of the additive effect at neuromuscular junction.^[45]

Regional anesthesia

RA is equally safe as GA. However, patient acceptance, positioning, and assessment of RA are particularly challenging. Although some authors have mentioned RA as a relative contraindication in ID patients because of patient refusal and lack of cooperation,^[46] others have mentioned it to be the mainstay of anesthesia management and postoperative pain relief in ID children.^[47-50] RA techniques, such as epidural anesthesia (lumbar or caudal), spinal anesthesia, and combined spinal-epidural anesthesia, with local anesthetic used alone or with opioids (hydromorphone or fentanyl) and alpha-2-adrenergic agonists (clonidine) have been used

in CP patients safely. Low spinal baclofen doses decrease spasticity better than when orally administered and have few adverse effects.

When an epidural analgesia is used to control postoperative pain, prolonged pressure on bony structures may lead to skin injury, particularly in malnourished children.^[49] Children under RA may develop compartment syndrome due to orthopedic procedures in lower limbs and an inability to report pain. Hence, optimal care should be taken with the plaster and legs should be elevated to decrease the risk of this complication.^[49,51] In patients with associated scoliosis of spine, catheter introduction may be difficult and should be performed by experienced professionals.^[49,51]

Postoperative Assessment and Recovery

The caregiver should always be present in the recovery room for continuous monitoring and assessment of the recovery of ID patients to their preoperative physical or mental status.^[10] In cases of limited communication, prior knowledge of the expressions or reactions to pain or discomfort of the patient can be of great benefit in assessment of pain and analgesic requirements.

A common complication in ID patients is postoperative delirium. The severity of ID, history of delirium, psychiatric complications associated with the ID, medical frailty, and stresses of the surgical procedure have been recognized as risk factors for postoperative delirium. Careful observation by the nursing staff and the judicious use of antipsychotic medications may be required in these patients.^[52-54]

Compliance with incentive spirometry and early ambulation may be difficult because of fear, distress, and communication problems.^[54] Frequent turning and positioning to avoid postoperative ulcers may be required in patients with preoperative spasticity.^[54] These patients are also at risk for dehydration and secondary infections in the postoperative period because of difficulties with drinking, eating, and using assistive devices.^[55-57]

Postoperative analgesia

Reynell concluded that pain is experienced by ID patients similar to other patients and the pain response did not vary due to the level of cognitive impairment.^[58] Moreover, they may experience more pain than their counterparts due to other chronic physical problems, complex medical disorders, and more frequent injuries.^[59] Unrelieved pain can cause tremendous patient discomfort and further exacerbate cognitive impairment and ultimately affect all areas of life, such as social, physical, mental, and emotional well-being.^[60] Hence,

pain management is essential. However, pain management is difficult in ID patients as the assessment is often complicated by their limited communication skills, multiple complex pain problems, and the presence of maladaptive behaviors.^[61] Various tools are available for measuring postoperative pain in patients with mild to severe cognitive impairment [Table 5].^[61]

Self-reporting using VAS and the Faces Pain Scale-revised can be better if the patient is able to do so while in pain. Observational assessment using the revised and individualized Faces, Legs, Activity, Cry, and Consolability (FLACC) tool has been identified as a reliable and valid measure of pain assessment in ID children. However, the tools specifically designed for developing children such as FLACC and Child Facial Coding System have little evidence for use in ID children.^[61] The Noncommunicating Children's Pain Checklist – Postoperative Version should be used for clinical use, especially when self-report is not possible or doubtful. It has the advantage of assessing pain without the need of previous experience with a child,^[61] shorter observation period, cut-off scores for assessing severity of pain, good inter-rater reliability,^[61] and maximal evidence of psychometric soundness among all the available observational tools for clinical use in ID children.

Potential adverse effects of any pharmacological agent need to be considered when considering treatment of procedural pain in ID patients as the patient may have a limited capacity to report such symptoms. The risk of constipation with opioids and gastric bleeding, ulceration, and cardiac events with nonsteroidal anti-inflammatory drug needs to be considered. Both of these can impair cognition to some extent.^[60] Use of IV paracetamol seems to be a safer option for mild to moderate postoperative pain. Regional techniques when feasible should be used to cover the postoperative period.

Table 5: Tools for measuring postoperative pain in patients with mild to severe cognitive impairment

Self-report tools	Observational assessment tools
100 mm VAS	For children
Faces pain scale - revised ^[62]	Revised FLACC ^[64]
Wong-baker faces pain rating scale ^[63]	Child facial coding system ^[65-67]
	Échelle DESS ^[68]
	NCCPC-PV ^[69]
	Pediatric pain profile ^[70]
	Pain indicator for communicatively impaired children ^[71]
	For adults
	NCAPC ^[72]
	The pain and discomfort scale ^[73]
	Chronic Pain Scale for Nonverbal Adults with Intellectual Disabilities ^[74]

VAS = Visual analogue scale, FLACC = Face, Legs, Activity, Cry, and Consolability, DESS = Douleur Enfant San Salvador, NCCPC-PV = Noncommunicating Children's Pain Checklist-Postoperative Version, NCAPC = Noncommunicating adult pain checklist

Special situations

Cerebral palsy

Postoperative epidural analgesia is acceptable for patients with CP. Continuous postoperative infusion of bupivacaine or ropivacaine, with hydromorphone or fentanyl, with the addition of clonidine can be used.^[13] A short-acting IV opioid (tramadol) and a nonsteroidal anti-inflammatory agent (IV ketorolac, IV paracetamol or rectal diclofenac) can also be used.

Documentation

An appropriate record, including the type of anesthesia, the names of all drugs administered, including local anesthetics, their dosages, and monitored physiological parameters must be maintained in all anesthetic procedures.^[75] Documentation of the technique of airway management and problems encountered should be clearly mentioned. Any complication and their management should be properly documented for future reference and the patient's relative/guardians informed. Documentation of postoperative pain and its management is also very essential. These include giving written information and advice on pain assessment and treatment to parents before discharge after surgery and teaching them to use pain assessment tools to help them manage the postoperative pain.^[76] The authors suggest an anesthetic document listing the challenges and their management along with complications, if any, to be given to the caretakers of the ID patients on discharge for future reference and management.

Conclusion

Thus, treating the ID patient is a challenge for the treating anesthesiologist. The most important principle in dealing with all types of ID patients is to be considerate. The common problems of lack of cooperation, communication, and cognitive impairment make every step of any anesthetic technique a difficult task. It is important for the anesthetist to recognize and understand the patient's medical, physical, behavioral factors, so that he/she can be better prepared for selecting acceptable anesthetic agents and techniques. Proper counseling and education of patients along with caretakers and an unhurried considerate approach with the presence of a familiar person during anesthetic technique are the other key elements of a successful anesthetic technique.

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Conflicts of interest

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CONFERENCE CALENDAR October-December 2017

Name of conference	Dates	Venue	Name of organising Secretary with contact details
19 th Annual Meeting of Indian Society of Neuroanesthesiologists and Critical Care. (International Neurotrauma Symposium will be included) Theme of the meeting: "Integrating Technology; Enhancing Outcomes"	18 th - 21 st January 2018	The Leela, Andheri (East), Mumbai	Rajshree Deopujari D.A, M.D Organising Secretary ISNACC 2018, Senior Consultant Anesthesiologist Jaslok Hospital and Research Centre Mumbai 400 026 Cell no: +91 9821116771 Personal E-mail : rdeopujari@gmail.com Conference E-mail : isnacc2018@gmail.com
ASOCON 2018 3 rd National Conference of the Anesthesia Society for the Obese and Bariatric Anesthesia CME Series 9	3 rd - 4 th February 2018	Max Super - speciality Hospital, Saket, New Delhi	Dr. Aparna Sinha Director Anesthesiologist Max Institute of Minimal Access, Metabolic, and Bariatric Surgery, Max Super Speciality Hospital, West Wing, 2, Press Enclave Road, Saket, New Delhi - 110017 Lakshmi Jayaraman – +91-9811-203-658 E-mail: info@mbafindia.com / asocon2018@gmail.com www.mbafindia.com
33 rd Annual National Conference of The Indian Society for The Study of Pain	2 nd - 4 th February 2018	Hotel Raddison Blu Plaza, New Delhi	CONFERENCE SECRETARIAT Dr. Pradeep Jain, Organising Secretary ISSPCON 2018 Department of Anaesthesiology, Pain and Perioperative Medicine 7th Floor, Super Speciality Research Block (SSRB) Sir Ganga Ram Hospital, Rajinder Nagar, New Delhi - 110060, India Phone No.: +91 11 42252701, Mobile: +91 9810088960 E-mail: isspcon2018@gmail.com