Scan to Download the App

diginerve
A Jaypee Initiative
Your Guide at Every Step
Video Lectures | Notes | Self-Assessment

# Short Textbook of
# Anesthesia

*As per the Competency Based Medical Education Curriculum (NMC)*

Ajay Yadav

7th Edition

JAYPEE

SHORT TEXTBOOK OF

# ANESTHESIA

# Disclaimer

Medicine is an ever and rapidly changing science. The author has tried his best to obtain the information from the sources which he has believed to be the most reliable and in accordance with the latest guidelines and recommendations. However, there is always a possibility of error and change in guidelines. Therefore, author and publisher disclaim all the responsibilities arising from any act of commission or omission, because of the information used from the contents of this book.

# SHORT TEXTBOOK OF

# ANESTHESIA

*As per the Competency Based Medical Education Curriculum (NMC)*

**SEVENTH EDITION**

**Ajay Yadav**
MD (Anesthesiology)
Senior Consultant and Head
Department of Anesthesia and Critical Care
W Pratiksha Hospital
Gurugram, Haryana, India


**JAYPEE BROTHERS MEDICAL PUBLISHERS**
*The Health Sciences Publisher*
New Delhi | London

**Jaypee Brothers Medical Publishers (P) Ltd.**

**Headquarters**

Jaypee Brothers Medical Publishers (P) Ltd.
EMCA House
23/23-B, Ansari Road, Daryaganj
New Delhi - 110 002, India
Landline: +91-11-23272143, +91-11-23272703
+91-11-23282021, +91-11-23245672
Email: jaypee@jaypeebrothers.com

**Corporate Office**

Jaypee Brothers Medical Publishers (P) Ltd.
4838/24, Ansari Road, Daryaganj
New Delhi 110 002, India
Phone: +91-11-43574357
Fax: +91-11-43574314
Email: jaypee@jaypeebrothers.com

Website: www.jaypeebrothers.com
Website: www.jaypeedigital.com

**Overseas Office**

J.P. Medical Ltd.
83 Victoria Street, London
SW1H 0HW (UK)
Phone: +44 20 3170 8910
Fax: +44 (0)20 3008 6180
Email: info@jpmedpub.com



**Short Textbook of Anesthesia**

*Sixth Edition*: 2018

Seventh Edition: **2024**

ISBN: 978-93-5696-619-2

*Printed at*

# Contents

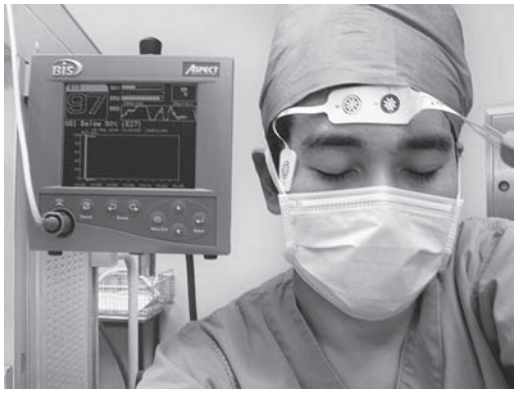



**Fig. 6.7:** Bispectral index monitoring.

by set algorithm. It exhibits a score of 100 for fully awake state and 0 for completely silent brain. *Bispectral index score (BIS) score of 45–60 indicates adequate depth.*

- **Patient state index:** It is same like BIS index, however, a score of 25–50 indicates adequate depth.
- **Narcotend:** It analyzes EEG to give 6 stages, from A to F. A represents awake state while F represents silent EEG.
- **Entropy:** Entropy, which measures the degree of disorder and synchrony in EEG to calculate entropy score, is a new monitor.

*As ketamine, nitrous oxide and dexmedetomidine do not causes depression of EEG therefore EEG-based monitors cannot be utilized to monitor the depth of anesthesia with these agents.*

### *End-tidal Anesthetic Concentration*

In spite of studies showing that maintaining end-tidal concentration of inhalational agents between 0.7 and 1.3 MAC is as effective as BIS to monitor the depth of anesthesia, it is not considered as highly reliable because it is an indirect measure of level of consciousness. Moreover, it can be used only to monitor depth with inhalational agents (cannot be used for total intravenous anesthesia).

### *Auditory-evoked Response*

Although difficult to monitor but is considered as reliable as BIS index to monitor the depth of anesthesia.

## Cerebral Blood Flow Monitors

- Xenon$^{133}$ wash out—very cumbersome device
- Transcranial Doppler—*very simple and non-invasive method to monitor cerebral blood flow*
- Jugular vein oxygen saturation
- Cerebral oximetry by special probes applied at forehead
- **Thermodilution:** It is invasive method, 2 thermistors of different temperature are placed in brain and difference in temperature is noted to calculate blood flow.

## Monitoring Nociceptin

Till date, we do not have a monitor which can measure the intensity of pain during general anesthesia and we have to rely on clinical signs such as hypertension and tachycardia.

## MANDATORY MONITORS (FIG. 6.8)

- Pulse oximetry
- Non-invasive blood pressure
- Capnography for cases under general anesthesia
- ECG
- Temperature (general anesthesia >30 minutes and surgery >1 hour)

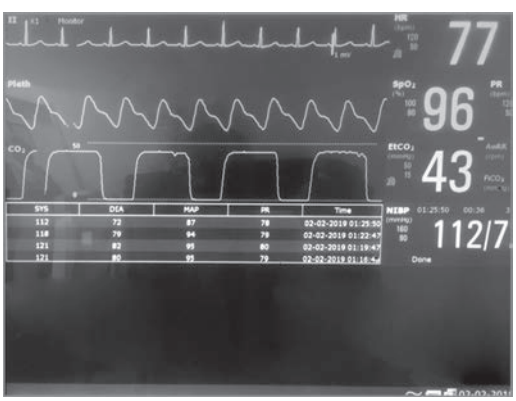



**Fig. 6.8:** Mandatory monitors, note that temperature is missing.

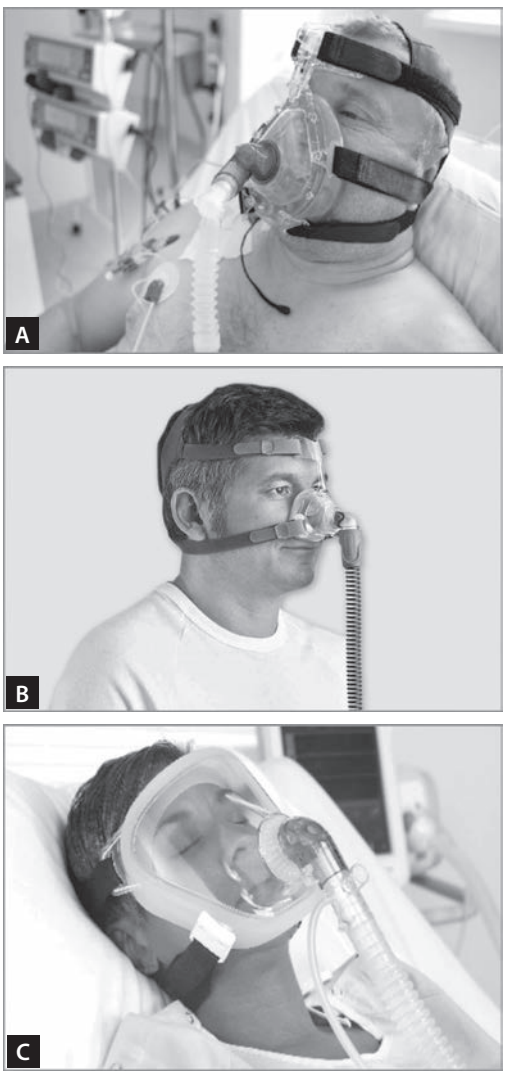
*Most commonly used for NIPPV is tight fitting face mask in acute setting* **(Fig. 40.8A)** *and nasal mask* **(Fig 40.8B)** *in chronic setting* (for sleep apnea syndrome). Other options are full face mask **(Fig. 40.8C)** and helmet.

## Modes of Ventilation

Modes of ventilation utilized for NIPPV are CPAP and BIPAP (already described above).

## Protocol and Principles for NIPPV

- Explain the procedure to patient
- Mask should be tight fitting




**Figs. 40.8A to C:** (A) NIV with face mask; (B) NIV with nasal mask; (C) NIV with full face mask.

- Preferably keep head end in propped up position
- Usual settings are:
  - *Inspiratory pressure (IPAP)*: 8–20 cm $H_2O$. Do not exceed above 20 cm $H_2O$ (aspiration can occur).
  - *Expiratory pressure (EPAP)*: 5–10 cm $H_2O$
  - *$FiO_2$*: 1.0 to begin with
  - *Trigger sensitivity (ability of ventilator to detect spontaneous breath)*: Maximum
  - Titrate IPAP, EPAP and $FiO_2$ as per tidal volume and blood gases.
  - Give a trial for 1–2 hours, if there is no improvement or deterioration consider intubation. If there is improvement reassess after every 4 hours.

## Complications

- **Leakage:** This is a major problem during NIPPV. Although most of the machines compensates for mild to moderate leaks; however, significant leaks can cause hypoventilation. It is best avoided by using tight fitting masks.
- **Patients inconvenience and claustrophobia:** It is one of the very important deterrents to start NIV
- Increased chances of aspiration
- Skin breakdown, facial edema on prolonged use.
- Delay in intubation.

# WEANING FROM VENTILATOR

Weaning means discontinuing the ventilatory support. Generally accepted parameters for weaning are (these are simply the reversal of criteria for putting the patient on ventilator):

- $pO_2$ >60 mm Hg (and oxygen saturation >90%) on $FiO_2$ <60% and PEEP <5 mm Hg.
- $pCO_2$ <50 mm Hg.
- Respiratory rate <35/min.
- Vital capacity >15 mL/kg.
- VD/VT <0.6.
- Tidal volume >5 mL/kg.
- Inspiratory pressure < –25 cm $H_2O$ ( patient is requiring more force to generate tidal volume)

## J



## K



## L



## M