Region Hovedstaden

Approved 24 March 2011, version 1

Document features	Regional guidelines
Applicable to	The Capital Region of Denmark's general hospitals
Target group	Healthcare staff involved in sedation with propofol in general hospitals in the Capital Region of Denmark
Prepared by	SFR (Secretariat for Reference Programmes) for gastroenterology, surgery and anaesthetics
Specialist responsibility	SFR Gastroenterology Committee
Keywords	moderate sedation, risk assessment, anaesthesia, contraindications, ASA, sedation level, sedation training, NAPS course

Propofol sedation for gastroenterological, endoscopic procedures performed by non-anaesthetically-trained personnel – and associated training

Shortcuts to contents

Objective

To ensure that patients sedated with propofol for gastroenterological, endoscopic procedures, without the assistance of anaesthetics staff, are treated uniformly, safely and appropriately.

Target group and area of application

These guidelines are aimed at healthcare staff and their managers who are involved in sedating patients with propofol in connection with gastroenterological, endoscopic procedures without the assistance of anaesthetic personnel, and healthcare staff on wards receiving patients for observation post-anaesthesia.

Region Hovedstaden

The individual endoscopy departments at the region's hospitals wishing to introduce the method must do so in collaboration with their local anaesthetics department and only following approval from their hospital management. Furthermore, it is the responsibility of the management of each individual hospital to ensure that adequate anaesthetics procedures are in place.

Definitions

- **NAPS**: **N**urse **A**dministered **P**ropofol **S**edation
- **NAPS nurse:** The nurse who administers propofol for sedation after completing and passing a specific training course
- **Sedation**: Sedation refers to medication with benzodiazepines, opioids, barbiturates etc. or a combination of these, in order to decrease anxiety, relax the patient and provide pain relief in connection with diagnostic and therapeutic procedures.
- **Premedication**: Administration (oral or rectal) of a dose of medication, corresponding to a premedication, in in preparation for a procedure.

Sedation depths:

- **Minimal sedation (anxiolysis)**: A drug-induced state in which patients react normally when spoken to. Cognitive function and coordination may be inhibited but respiratory and circulatory functions are unaffected.
- **Moderate sedation (procedural or moderate sedation)**: Drug-induced effects on level of consciousness. Patients react satisfactorily to either speech alone or when accompanied by gentle tactile stimulation. Reflex withdrawal from painful stimulus is not considered a satisfactory response. No special measures are required to maintain an open airway. Spontaneous respiration is satisfactory and circulation is usually unaffected.
- **Deep sedation/analgesia**: A drug-induced decrease in the level of consciousness where patients are difficult to wake but react appropriately to repeated or painful stimulation. Patients may be unable to maintain a clear airway unaided, and assistance may be required. Circulation is usually unaffected.
- Propofol sedation by non-anaesthetists is only performed in the case of minimal or moderate sedation

Procedure

1. Scope and responsibility of healthcare staff performing sedation with propofol

1a Responsibility and attendance

In addition to the NAPS nurse, there must be a doctor and an assisting nurse in the examination room prior to initiation of propofol sedation.

A minimum of two people (one doctor and one nurse) must be present until the patient has woken up after sedation.

The doctor responsible for the examination

- Bears the overall responsibility for the sedation and must have an in-depth knowledge of propofol sedation
- Must remain with the patient until he or she is awake after sedation and there is no longer any risk of respiratory depression

The NAPS nurse

- Together with the doctor, must ensure prior to sedation that NAPS is not contraindicated, based on currently applicable guidelines
- Is responsible for planning and performing NAPS based on the patient's age, underlying health status and the nature of the procedure
- Is solely responsible for NAPS (observation and sedation of the patient) and does not participate in other tasks during the examination

The nurse has the authority to stop both sedation and the procedure in the interests of patient safety ("veto right") if he or she encounters a medical indication for doing so.

Anaesthetic assistance must be available at all times, and NAPS may only be performed if there is an anaesthetist in the immediate vicinity.

1b. Training and authority

The doctor responsible for the examination has the overall responsibility for sedation and must have completed a theoretical and practical training course in propofol sedation. The doctor in question must also be trained in airway management and be able to handle any complications in cooperation with the NAPS nurse. (See appendix 8, LINK for doctors)

The nurse administers propofol under the responsibility of the doctor responsible for the examination. Nurses who help with, or perform sedation with propofol, must also have received structured, relevant training, i.e. theoretical and practical training in propofol sedation and airway management. (See appendix 8, LINK for nurses)

A plan must be in place for the maintenance of the skills of both doctors and nurses. Staff managing or assisting in propofol sedation must be involved in this form of sedation on a regular basis and all must be trained in basic resuscitation.

The job description and authorisation form must specify that the individual is authorised to perform sedation with propofol.

1.c Quality monitoring and adverse events

Adverse events in connection with propofol sedation, including complications and/or unintentional deep sedation, must be documented and reported pursuant to regional guidelines. These events are evaluated on a regular basis and necessary changes made to relevant guidelines.

2. Definition of patient groups

2.a Propofol sedation by non-anaesthetists may only be performed

- on patients in ASA classes 1 and 2
- on children over 10 years of age
- in examinations expected to last less than one hour.

Patients in ASA group 3 and above, and children under 10, may only be sedated with the assistance of staff trained in anaesthetics.

2.b Contraindications

Absolute contraindications

- Soya, egg and peanut allergies
- Pregnancy
- Sleep apnoea in patients on CPAP/BIPAP treatment.

The following patients are unsuitable for propofol sedation by non-anaesthetic-personnel due to increased risk of airway complications

- BMI ≥ 35
- Non-compliance with fasting guidelines
- High respiratory assessment score, equal to or above 4 (must be discussed with the anaesthetist)
- Risk of gastric retention, acute upper gastrointestinal haemorrhage, sub-acute bowel obstruction/ ileus, achalasia
- Sleep apnoea
- Previous problems with anaesthesia.

See appendix 1 LINK.

3. Assessment and preparation of patients for sedation with propofol

3.a. Assessment of the patient

The doctor and the NAPS nurse must ensure that the patient is suitable for propofol sedation according to the contraindications above and a risk analysis based on:

- the ASA classification model
- presence of sleep apnoea
- airway assessment
- neck extension
- BMI
- medication taken.

The doctor must also auscultate the heart and lungs.

See appendix 1 LINK.

3.b Preparation of the patient

- Check the patient's ID and consent to the procedure and sedation
- Preoxygenation: All patients must be given 3 litres of supplemental oxygen via nasal prongs before and during sedation
- Vital signs must be measured before administration (SAT, BP, RR and pulse)
- ECG monitor must be attached
- Position with elevated bed head (see appendix 4).

Checklist: See appendix 1B LINK

4. During sedation

Propofol dose must be titrated according to the recommendations for propofol administration (see appendix 2 LINK).

- Time-out must be recorded on the sleeping patient (LINK to instructions)

Oxygen: 3 litres of oxygen are given continuously via nasal prongs

Monitoring:

- The depth of the patient's sedation and respiration are monitored continuously by the NAPS nurse.
- Respiratory and circulatory function are monitored using pulse oximetry and ECG and by recording blood pressure every 5 minutes (or more often if required).
- Changes in the patient's state must be reported to the doctor performing the endoscopy.

See appendix 3 LINK.

5. Following sedation - observation, monitoring and discharge

- Patients who have been sedated with propofol must be monitored continuously until they are ready for discharge or transfer back to their ward
- Blood pressure, pulse, oxygen saturation and level of consciousness must be monitored and documented at least every 15 minutes, until the criteria for discharge are met.
- The patient may not leave the ward until at least 20 minutes after the last dose of propofol has been given.
- Physiological discharge criteria are applied to completion of the procedure/discharge of the patient. See appendix 5 LINK.

6. Equipment in the examination room

All examination rooms used for propofol sedation must have the following equipment:

- Oxygen and suction
- ECG monitoring
- Non-invasive BP monitoring
- Pulse oximetry
- Equipment for obtaining IV access and IV fluids
- Infusion pump
- First-line drugs
- Ventilation bag, laryngeal mask and tongue blade
- DC defibrillator in the immediate vicinity of the room

Documentation must be in place to facilitate regular checks of the presence and function of monitoring and resuscitation equipment, either in the examination room or its immediate vicinity. Inspection of monitoring and resuscitation equipment must be documented in log books pursuant to local regulations.

Region Hovedstaden

7. Documentation

All assessments, scores and observations prior to, during and after sedation must be documented and noted in the patient's notes on the sedation chart. The same chart is used throughout the hospital, whenever permission is given for non-anaesthetists to perform propofol sedation.

Responsibility and organisation

The hospital management is responsible for:

- selecting the departments entitled to use propofol for sedation after completion of an appropriate training course
- ensuring that administration of propofol sedation by non-anaesthetists is performed uniformly throughout the organisation.
- developing an observation chart at hospital level for use in all areas of the organisation in which propofol sedation is performed (this could be the hospital's anaesthesia chart).
- ensuring that safety is monitored during administration of sedation.

The management of departments/clinics in sections with permission to perform propofol sedation are responsible for:

- ensuring that appropriate equipment and medication—as a minimum, compatible with the standards in these guidelines—is available in all rooms in which sedation with propofol is performed.
- ensuring that relevant staff are trained as per the instructions in these guidelines and that training courses are run in collaboration with the anaesthetics department.
- ensuring that propofol is used only in compliance with the instructions in these guidelines.
- authorising doctors and nurses trained in propofol sedation to perform sedation, and ensuring that such authorisation is included in job descriptions.

References, legislation, medical evidence and links

- Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. Anesthesiology 1996; **84:** 459-71.European Society of Gastrointestinal Endoscopy, European Society of Gastroenterology and Endoscopy Nurses and Associates, and the European Society of Anaesthesiology Guideline: Non-anaesthetist administration of propofol for GI endoscopy. Eur J Anaesthesiol. 2010;27:1016-30.
- Practice guidelines for sedation and analgesia by non-anesthesiologists. Anesthesiology 2002;96:1004ff
- Hypoxia during upper gastrointestinal endoscopy with and without sedation and the effect of pre-oxygenation on oxygen saturation. Anaesthesia 2000;55: 654-658.
- Monitoring and supplement oxygen during endoscopy. BMJ 1995; 310:886-887, Evidens grad III.
- Pre-anaesthetic evaluation, tests and patient information, SFR Anaesthesiology, Guidelines for sedation and/ or analgesia by Non-anaesthesiology Doctors EJA 2007; 24:563-567

- Regional guidelines: Sedation of patients for operations or procedures without the assistance of anaesthetic personnel
- Regional guidelines: Fasting in connection with anaesthesia
- Regional guidelines: Informed consent – for treatment and disclosure of health details
- Regional guidelines: The Five Steps: ensuring the correct treatment and surgery on the correct patient
- The Danish Society of Anaesthesiology and Intensive Care Medicine's recommendation for the preparation of criteria for discharge from an anaesthetic department to a surgical ward following anaesthesia

Kommentar [A1]: These guidelines are available in English (with the addition of "..correct patient and correct side")

Accreditation standards

DDKM (Danish Healthcare Quality Programme): 2.1.1, 2.10.2
JCI (4th edition): AK 2, AK. 3

Others, if applicable:

Appendices

Appendix 1A: Contraindications and assessment of patients prior to propofol sedation
Appendix 1B: Preparation of the patient for propofol sedation - checklist
Appendix 2: Recommendations for dosage of propofol
Appendix 3: Monitoring and preoxygenation of the patient
Appendix 4: Positioning the patient
Appendix 5: Recovery from anaesthesia and discharge
Appendix 6: Management of respiratory depression and airway complications
Appendix 7: Management of circulatory complications
Appendix 8: Training of nurses and doctors in the management of propofol sedation in connection with gastroenterological and endoscopic procedures

Region Hovedstaden

Appendix 1 A: Contraindications and assessment of patients prior to sedation with propofol

A. Contraindications

Absolute contraindications

- Soya, egg and peanut allergies
- Pregnancy
- Sleep apnoea patients undergoing treatment with CPAP/BIPAP.

The following patients are not suitable for propofol sedation by non-anaesthetic personnel due to increased risk of airway complications

- BMI ≥ 35 (see below)
- Non-compliance with fasting guidelines
- High respiratory assessment score (≥ 4). Must be discussed with the anaesthetist (see below)
- Risk of gastric retention, acute upper gastrointestinal haemorrhage, sub-acute bowel obstruction/ileus, achalasia
- Sleep apnoea (see below)
- Previous problems with anaesthesia.

B. Risk analysis prior to sedation

1. ASA classification
2. Sleep apnoea
3. BMI
4. Airway assessment, including neck extension

1. ASA classification

Prior to sedation, all patients must be classified according to the ASA classification system, which is the responsibility of the doctor performing the endoscopy together with the NAPS nurse.
It is the doctor's responsibility to note the ASA classification in the patient's journal, and the NAPS nurse must also note the ASA classification on the sedation chart
If there is any doubt about the ASA score, the patient must be discussed with the anaesthetist prior to sedation.

In 1941, the **A**merican **S**ociety of **A**nesthesiologists (**ASA**) defined the ASA physical status classification system with the aim of assessing pre-operative risks. The idea was to assess the patient's health status prior to operation regardless of the procedure to be performed.
The original classification has been slightly revised over time and currently comprises the following 6 categories:
ASA 1 Normal healthy patient
ASA 2 Mild systemic disease - with no functional limitation
ASA 3 Severe systemic disease* - with moderate functional limitation
ASA 4 Severe systemic disease that is a constant threat to life
ASA 5 Moribund patient who is not expected to survive beyond 24 hours with or without the operation
ASA 6 Brain-dead organ donor

**regardless of whether the systemic disease is a disorder for which the patient is receiving treatment.*

ASA CLASSIFICATION – examples

ASA I: *Normal healthy patient*
Normal healthy male with inguinal hernia
Normal healthy female with uterine fibroids

ASA II*: Mild systemic disease - with no functional limitation*
Heart disease with no or only mild functional limitation
Well-controlled diabetes
Well-controlled hypertension
COPD with mild functional limitation
Age under 1 or over 80

ASA III: *Severe systemic disease - with moderate functional limitation*

Heart disease with permanent functional limitation
Angina pectoris
Diabetes with vascular, late-stage complications
COPD with moderate functional limitation (the patient can walk up to the first floor at a reasonable pace)

Heavily overweight, BMI equal to or above 35

ASA IV: *Severe systemic disease* that is a constant threat to life.*

Distinct uncompensated heart disease
Angina at rest
Fresh case of AMI
Severe pulmonary, hepatic, renal or endocrine insufficiency

COPD: Dyspnoea at rest, possibly oxygen at home, severely restricted functional level

ASA V: Moribund patient who is not expected to survive beyond 24 hours with or without operation

Ruptured aortic aneurism with shock
Multi-trauma patient in shock

*regardless of whether the systemic disease is a disorder for which the patient is receiving treatment.

2. Sleep apnoea

Sleep apnoea contraindicates propofol sedation as propofol can transform a mild case of sleep apnoea into a severe one.

Patients who have been diagnosed with sleep apnoea and undergoing CPAP/BIPAP therapy must not receive propofol sedation and must always be referred to the anaesthetics department.

If the patient states that they experience breathing problems when sleeping, and where this has not been investigated or sleep apnoea diagnosed, the patient must fill out an ESS chart (Epworth Sleepiness Scale) prior to sedation (table 1).

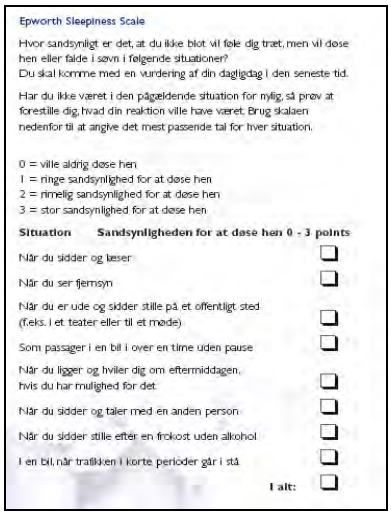
An ESS (Epworth sleep score) defines the degree of severity of the patient's sleep apnoea.

If the ESS score is less than 6 the patient may be sedated with propofol if other conditions allow (BMI, airway assessment etc.).
If the ESS score is 6 or above the patient should be advised to ask his/her GP to initiate investigations for

sleep apnoea. As this can take 3 to 6 months, the patient must be sedated by the anaesthetics department if the procedure cannot wait.

Region Hovedstaden

Table 1.



Epworth Sleepiness Scale

Hvor sandsynligt er det, at du ikke blot vil føle dig træt, men vil dose hen eller falde i søvn i følgende situationer?
Du skal komme med en vurdering af din dagligdag i den seneste tid.

Har du ikke været i den pågældende situation for nylig, så prøv at forestille dig, hvad din reaktion ville have været. Brug skalaen nedenfor til at angive det mest passende tal for hver situation.

0 = ville aldrig dose hen
1 = ringe sandsynlighed for at dose hen
2 = rimelig sandsynlighed for at dose hen
3 = stor sandsynlighed for at dose hen

Situation	Sandsynligheden for at dose hen 0 - 3 points
Når du sidder og læser	❑
Når du ser fjernsyn	❑
Når du er ude og sidder stille på et offentligt sted (f.eks. i et teater eller til et møde)	❑
Som passager i en bil i over en time uden pause	❑
Når du ligger og hviler dig om eftermiddagen, hvis du har mulighed for det	❑
Når du sidder og taler med en anden person	❑
Når du sidder stille efter en frokost uden alkohol	❑
I en bil, når trafikken i korte perioder går i stå	❑
I alt:	❑

3. BMI - Body Mass Index

Patients with a BMI (Body Mass Index) of 35 or above may not be given NAPS as it can make airway management difficult.

BMI is a unit of measurement used to classify body weight. BMI is an international unit of measurement.

$$\text{BMI} = \frac{\text{kropsvægten i kg}}{\text{højden i meter}^2}$$

$$\text{BMI} = \frac{\text{body weight in kg}}{\text{height in m}^2}$$

The normal range for BMI is 19.0 – 25.

A BMI of below 18.5 indicates malnourishment; however, it may also indicate a genetically-determined slight build and musculature.

The BMI can only be used for fully developed, or almost fully developed, adults (over 18 years of age), since the BMI of children varies greatly with age.

There are various BMI tables that can make the calculation of BMI quick and easy.

Region Hovedstaden

BMI TABLE

Height in CM

Weight	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200
108 kg	63.9	59.3	55.1	51.4	48.0	45.0	42.2	39.7	37.4	35.3	33.3	31.6	29.9	28.4	27,0
104 kg	61.5	57.1	53.1	49.5	46.2	43.3	40.6	38.2	36.0	34.0	32.1	30.4	28.8	27.4	26,0
100 kg	59.2	54.9	51.0	47.6	44.4	41.6	39.1	36.7	34.6	32.7	30.9	29.2	27.7	26.3	25,0
96 kg	56.8	52.7	49.0	45.7	42.7	40.0	37.5	35.3	33.2	31.3	29.6	28.0	26.6	25.2	24,0
92 kg	54.4	50.5	46.9	43.8	40.9	38.3	35.9	33.8	31.8	30.0	28.4	26.9	25.5	24.2	23,0
88 kg	52.1	48.3	44.9	41.9	39.1	36.6	34.4	32.3	30.4	28.7	27.2	25.7	24.4	23.1	22,0
84 kg	49.7	46.1	42.9	40.0	37.3	35.0	32.8	30.9	29.1	27.4	25.9	24.5	23.3	22.1	21,0
80 kg	47.3	43.9	40.8	38.0	35.6	33.3	31.3	29.4	27.7	26.1	24.7	23.4	22.2	21.0	20,0
76 kg	45.0	41.7	38.8	36.1	33.8	31.6	29.7	27.9	26.3	24.8	23.5	22.2	21.1	20.0	19,0
72 kg	42.6	39.5	21.7	34.2	32.0	30.0	28.1	26.4	24.9	23.5	22.2	21.0	19.9	18.9	18,0
68 kg	40.2	37.3	34.7	32.3	30.2	28.3	26.6	24.9	23.5	22.2	21.0	19.9	18.8	17.9	17,0
64 kg	37.9	35.1	19.3	30.4	28.4	26.6	25.0	23.5	22.1	20.9	19.8	18.7	17.7	16.8	16,0
60 kg	35.5	32.9	30.6	28.5	26.7	25.0	23.4	22.0	20.8	19.6	18.5	17.5	16.6	15.8	15,0
56 kg	33.1	30.7	28.6	26.6	24.9	23.3	21.9	20.6	19.4	18.3	17.3	16.4	15.5	14.7	14,0
52 kg	30.8	28.5	26.5	24.7	23.1	21.6	20.3	19.1	18.0	17.0	16.0	15.2	14.4	13.7	13,0
48 kg	28.4	26.3	24.5	22.8	21.3	20.0	18.8	17.6	16.6	5.7	14.8	14.0	13.3	12.6	12,0
44 kg	26.0	24.1	22.4	20.9	19.6	18.3	17.2	16.2	15.2	14.4	13.6	12.9	12.2	11.6	11,0
40 kg	23.7	21.9	20.4	19.0	17.8	16.6	15.6	14.7	13.8	13.1	12.3	11.7	11.1	10.5	10,0

4 Airway assessment and neck extension

Prior to sedation, all patients must undergo an airway assessment in order to anticipate any difficulties that might occur in the event of an airway obstruction or intubation.

There are several anatomical and pathological conditions that can make airway management difficult; consequently, the following assessments should be performed: Mallampati score, the patient's mouth opening, thyromental distance and neck extension, see below.

These parameters must be assessed for all patients when assessing the airway and the parameters noted on the sedation chart.

If the score is 4 or over, the patient must be discussed with an anaesthetist.

It is also important to be aware of the following:

- Short neck
- Large, full beard
- Prominent upper teeth
- Scar tissue after surgery / radiotherapy of the head and neck

Region Hovedstaden

LUFTVEJSVURDERING:

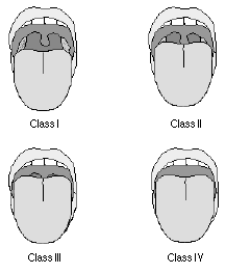
Mallampati:	Score
☐ Klasse 1, synlig gane, og hele uvula	0
☐ Klasse 2, synlig gane, og delvis synlig uvula	0
☐ Klasse 3, netop synlig basis af uvula	1
☐ Klasse 4, ingen synlig blød gane eller uvula	2

Gabeævne	☐ Over 3 cm = 0	☐ Under 3 cm = 2	
Mandiblen / tungeben (Thyromental afstand)	☐ > 2 fingersbredder = 0	☐ < 2 fingersbredder = 1	
Nakke éxtension	☐ Over 3 cm = 0	☐ Begrænset = 1	☐ Stiv = 4

Ialt score _____, Ved score ≥ 4 konfereres patienten med anæstilæge

Mallampati classification: This indicates the relation between the size of the tongue and the pharyngeal space.

The test is performed with the patient sitting upright, the head in a neutral position and the mouth open as wide as possible with tongue extended to maximum.



Class I – the soft palate, uvula, fauces and the back wall of the pharynx are visible – score 0 points

Kommentar [A2]: As in "pillars of fauces"

Class II – the soft palate, uvula and fauces are visible.
Score – 0 points

Class III – the soft palate and the base of the uvula are visible.
Score – 1 point

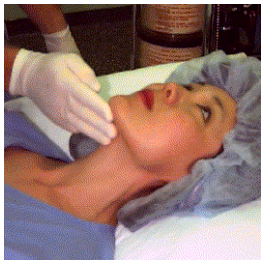
Class IV - the hard palate is visible.
Score – 2 points

Mouth opening: Normal opening: 3 cm, measured at the midline between the edge of the upper incisors and the lower incisors. In the case of edentulous patients, the distance between the gums is measured.

Mouth opening: 3 cm or over, score - 0 points

Mouth opening; less than 3 cm, score – 2 points

Thyromental distance: Distance from the mandible to the thyroid notch. This must be at least two fingers in adults.



These distances must be measured with the head fully extended.

Thyromental distance 2 fingers wide or over – score 0 points

Thyromental distance less than 2 fingers – score 1 point

Head extension:

The patient must be able to touch chest to chin and fully extend the neck.

Normal – score 0 points
Limited – score 1 point
Stiff – score 4 points

Region Hovedstaden

Appendix 1B: Preparation of the patient for propofol sedation - checklist

Admission

- **ID:** The patient's identity must be checked: Name and civil registration number. The patient is given an identity bracelet or the existing bracelet checked with the patient.
- **Consent**: The doctor must ensure that there is a need for the examination and inform the patient of the planned procedure. The doctor must check that the patient has consented both to the procedure and to sedation with propofol and that this is documented in the medical notes.

Supplementary questions and details must be checked

Fasting: The patient must be asked when he/she last ate and drank in accordance with fasting rules. The patient must not have eaten solid food and dairy products for 6 hours and 2 hours for clear fluids.

Medicine: Has the patient taken any medicine prior to sedation?

Anticoagulant medication: Has this been suspended according to the plan? Consider check INR.

Height and weight: In obese patients: calculate BMI (see appendix 1 LINK)

Glaucoma: There are contraindications to administration of Buscopan and Robinul by injection in patients with glaucoma.

Pacemaker: Diathermy should be used with caution. Check with a doctor.

ASA score: Only patients in ASA groups 1 and 2 may be sedated with propofol. Patients with an ASA greater than 3, including children under 10, may only be sedated with the assistance of anaesthetically-trained personnel. The ASA class assessment is conducted with the assistance of the doctor responsible for the examination.

Dental status: Dentures must be removed prior to examination and initiation of sedation. Dentures must be placed in a tray or in an envelope marked with the patient's name and civil registration number.

Airways: Patients must be asked whether they have any pre-existing airway problems (coughing, mucous, sleep apnoea, smoking etc.). Patients with an increased risk of secretions in the respiratory tract must be given an injection of intravenous Rubinol (0.2 mg) prior to administration of sedation.

Assessing the airway: The patient's airway must be scored with a view to airway management. If the score is 4 or over, the patient should be discussed with an anaesthetist. (See appendix 1 LINK)

Diabetes: Blood sugar must be checked immediately prior to sedation. In the case of IDDM, administration of a glucose infusion should be discussed with the physician-in-charge.

IV access: IV access must be established and a 500 ml NaCl infusion set up for all patients. Where possible, IV access should be sited in the right antecubital fossa to prevent pain when propofol is injected and to reduce the time required for the drug to reach the blood-brain barrier.

Monitoring: The patient's blood pressure, pulse, saturation and electrocardiogram must be monitored. The patient should, where possible, be in sinus rhythm, or well-controlled atrial fibrillation (ventricular rate < 100 at rest.) Exit values must be noted. (See appendix 3 LINK)

Preoxygenation: The patient should be given supplemental oxygen (3 litres via nasal cannulae). (See appendix 3 LINK)

Stethoscopy: The doctor should auscultate the heart and lungs.

Position: The patient should be positioned optimally to minimise risk of complications, e.g. pressure sore formation, nerve damage and aspiration. (See appendix 4 LINK)

Time-out: Should be performed.

Region Hovedstaden

Appendix 2: Dose recommendations for propofol sedation

Propofol is administered intravenously and should be used only as monotherapy (without the supplementary use of other drugs) in order to facilitate management of the sedation.

Guidelines for initial dosage in adults and children over 10 years of age:

- **100 mg minus the patient's age (however, max. dosage 60 mg).**
- **Initial dose to be given over 5 seconds with subsequent infusion of NaCl at a high flow rate.**
- **Changes in levels of consciousness and respiration must be observed. Subsequent dose (approx. ½ of the initial dosage) to be given after approx. 45-60 seconds**
- **Between 5 mg and up to ½ of the initial dose are then given at approximately 30-40 second intervals until the desired level of sedation is achieved.**

Factors that may affect the choice of dose must be taken into account:

Age, height/weight, anxiety, daily use of sedatives, analgesics and/or alcohol.

- If the patient has taken sedatives or strong analgesics on the day of the procedure, the initial dose should be halved or reduced compared to the normal dose.
- Patients with a history of sedative abuse, patients undergoing treatment for chronic pain and alcoholics often need larger doses in order to induce and maintain sedation.
- Conversely, patients who have recently been treated with tranquilisers often need smaller doses.

Maintenance of sedation:

Once the patient has been suitably sedated and the examination is underway, there are 3 different indications for deciding when the next dose should be given:

1. Movement: Movement of extremities, eyebrows, small sounds etc. (event dosage)
2. Respiration: Depth and rate is evaluated by palpation
3. Time: If the patient has stable and satisfactory respiration (respiratory rate 8 or above; no hypoxia), doses of 10-20 mg can be given after 1-2 minutes without waiting for movement or sounds (time dosage)

To begin with, new staff should use “event dosing” until they have acquired further skills and are familiar with propofol.

If the patient experiences pain during the examination, it may be necessary in the short-term to administer doses more frequently in order to achieve deeper sedation (e.g. in the case of biopsy, dilatation, painful endoscopy etc.).

Region Hovedstaden

Appendix 3: Monitoring and preoxygenation of the patient

Monitoring

As propofol sedation can affect the circulation and respiration; blood pressure, pulse, oxygen saturation, respiratory rate and ECG must be monitored in all patients. The patient's level of consciousness must also be monitored. Baseline values of the above should be recorded prior to onset of sedation.

The doctor should auscultate the heart and lungs.

Simple clinical observations of pulse, skin colour and temperature are also valuable observations when assessing the patient's status.

- ECG and oxygen saturation must be monitored continuously
- BP and pulse must be measured at least every 5 minutes.

.

Supplemental oxygen

All NAPS patients must be given 3 litres of supplemental oxygen via nasal prongs.

Use of supplemental oxygen increases the oxygen content of the lungs, which allows the doctor more time to intervene in the event of any problems maintaining/securing the patient's airway.

Patients with low oxygen saturation, i.e. below 95% despite use of supplement oxygen, may only be sedated with the assistance of an anaesthetist.

All observations before, during and after sedation must be documented and entered in the patient's notes.

Region Hovedstaden

Appendix 4: Positioning the patient

It is important to ensure that all sedated patients are optimally positioned since they are unable to protect themselves against pressure and nerve damage.

A sedated patient has a decreased swallowing reflex, and therefore is at significantly increased risk of aspiration. Correct positioning of the patient optimises and protects the patient's airway and and reduces the risk of aspiration.

Kommentar [A3]: ?gag

Upper gastrointestinal tract endoscopy, in particular EUS and ERCP, may stimulate copious secretions in the upper GI tract, and consequently results in increased risk of aspiration into the airway.

Particular caution should be observed when performing gastric lavage.

In general, in the case of deeply sedated patients, the head of the bed should, where possible, be slightly elevated (approx. 30 degrees) in order to prevent aspiration.

Patients with decreased pulmonary and cardiac function may have difficulty compensating for the physiological changes triggered by the position in which they are lying.

The nurse must ensure that the patient's eyelids are closed in order to prevent drying of the mucosa and damage to the eye.

In prolonged procedures the nurse should also observe for development of hypothermia. Cushioned pads should be used to help position the patient optimally.

Region Hovedstaden

Appendix 5: Recovery from anaesthesia and discharge

Recovery from anaesthesia/Recovery room

All patients having undergone sedation should be kept under constant observation, including monitoring of blood pressure, pulse and oxygen saturation, until the discharge criteria have been met.

All patients must, as a minimum, undergo monitoring of oxygen saturation until there is no longer any risk of respiratory depression.

Kommentar [A4]: This is fine, however - as I'm sure the author knows - satisfactory oxygen saturation does not exclude respiratory depression or hypercapnia.

A clinical assessment of each patient must be made to determine the duration of monitoring and the frequency of the checks. This assessment is based on the patient's alertness, general state of health and the duration of the sedation.

All values and the level of consciousness must be documented regularly, at least every 15 minutes.

Nurses in the recovery room must be able to identify the early stages of complications and appropriate interventions.

The doctor performing the endoscopy or his/her substitute must be on call and may not leave the hospital until all patients have met the discharge criteria.

There must be monitoring and resuscitation equipment in the recovery room or in the immediate vicinity.

Discharge criteria for patients going home

The patient must not leave the department until 20 minutes after the last dose of propofol has been given, at the earliest.

The patient can be discharged to a ward or home when he/she achieves a score of 0 - 1 based on the criteria below.

Alternatively, patients must be observed on a ward every 15 minutes, with recording of the observations, until a total score of 0 - 1 is obtained. Patients with a total score > 1will be transferred to the ward with an escort.

Discharge criteria

Factor	Score	Criterion	Points
Consciousness	0	Awake and lucid	
	1	Wakes to normal speech	
	2	Can be woken with light stimulation (e.g. measurement of BP)	
	3	Cannot be woken with light stimulation	
Respiratory rate	0	12-20/ min. Children: 14-24/min	
	1	9-11/ min or over 20 Children: under 14 or over 24/min	
	2	0-8/ min or more than 3 l O2 Children: under 10/min necessary	
Oxygen saturation without supplement oxygen	0	over 92 %	
	1	90 – 92 %	
	2	under 90 % (clinical signs of respiratory failure, cyanosis etc.)	

Total score:			

- Patients with a score of over 1 must be discharged by the doctor in charge, unless the patient was stable with a higher score prior to the procedure.

If monitoring cannot be continued until the patient has achieved a total score of 0 - 1, the patient must be transported to the recovery ward, unless the patient was stable with a lower score prior to the procedure.

Discharge criteria must be documented on the sedation chart in the patient notes both on discharge to home and return to the ward.

In the case of small children, other values can be applied to the discharge criteria. Documentation of the procedure performed and sedation must also be included, as must documentation of any prescriptions or precautionary measures related to observation and treatment of the patient.

- The patient must have achieved their normal level of mobility, be pain-free (or almost pain-free) and not be unduly bothered by queasiness or vomiting
- The patient must have a clear airway and adequate respiration. An irritable cough is acceptable.
- Oxygen saturation may not be below 93 on room air. (normal for the patient)
- The patient should have good skin colour and the skin must be warm and dry. Stable blood pressure, minimum systolic 100 mg Hg. (habitual state)
- Outpatients MUST be escorted home by a responsible adult (companion, taxi, Falck, etc.), and must not drive or go out into traffic on their own for the rest of the day. The nurse must ensure that the patient is informed of this and document same.
- The patient must be informed, both verbally and in writing, of who to contact in the event of any complications.

Appendix 6: Management of respiratory depression and respiratory complications - unexpected need of assistance by an anaesthetist

Because the transition between depths of sedation is gradual, sedation can be expected to vary between "light sedation" and brief "deep sedation". Therefore, it is important that each sedation is adjusted and titrated based on the patient's response.

Sedation targets relating to the patient:

1. Maintain spontaneous respiration
2. Ensure clear airway
3. Keep discomfort to a minimum and ensure that the patient is able to tolerate the examination
4. Reduce the patient's recall of the procedure
5. Reduce the drowsy state after the procedure/sedation
6. Increase patient satisfaction

Sedation targets for the doctor:

1. A cooperative patient who enables the doctor to perform a thorough, safe and effective examination and treatment
2. Opportunity for in-depth training of colleagues without patient discomfort

Respiratory depression and airway complications, including aspiration

If the patient develops inadequate respiratio/hypoxia and there is no anaesthetist present:

1. Stop administration of propofol
2. Increase supplemental oxygen
3. Stimulate the patient
4. Ensure patent airway (suction, tongue blade, nasal airway)
5. Stop the procedure
6. Assisted respiration using mask ventilation, airway device or laryngoeal mask.
7. Call an anaesthetist / anaesthetic nurse for help
8. Ensure adequate IV access

Laryngospasm

- *Mild to moderate laryngospasm*: The patient has audible inspiratory stridor, possibly with a persistent irritable cough at the early stage, stertorous breathing, decreasing SpO_2, cyanosis.
  - *For normal, healthy patients aged 16-60:*
    Lidocaine: 50 mg IV, this can be repeated after approx. 1 - 2 minutes. Max. dose 100 mg.
  - *In the case of older, weaker patients:*
    Lidocaine: 25 mg IV Bolus injection, max. dose 50 – 75 mg Lidocaine.
    Correct position of head and lower jaw and suction of the upper airway, if applicable, may improve the situation significantly.
- *Severe laryngospasm*, with total occlusion of the airway:
  - Positive-pressure ventilation with oxygen. The mask must be held tightly over the patient's face, using a tongue blade if applicable, and there must be constant pressure on the ventilation bag. Laryngospasm usually resolves spontaneously within a short timeframe.

- This treatment form can be more effective when performed by two persons.
- In the event of severe laryngospasm, an anaesthetist/anaesthetic nurse or person with ALS certification must always be called in case intubation is required.

Aspiration:

It can be difficult to determine whether a patient has aspirated. If there is any doubt, an anaesthetist should be called.

Patients who have aspirated into the lungs must be observed for signs of aspiration pneumonia and may require an X-ray of the lungs.

1. Increase supplemental oxygen
2. Raise the bed head

Patients at particular risk of aspiration. Patients who may have delayed gastric motility and, thus, an increased risk of aspiration into the lungs:

- Patients in acute pain who are being treated with morphine drugs
- Older patients
- Patients with nausea/vomiting
- Patients with diseases of the oesophagus and stomach and/or diminished swallowing ability
- Patients with a BMI $\geq$ 35
- Pregnant patients
- Patients with impaired cough reflex
- Supine patients
- Diabetic patients with a compromised autonomic nervous system

Region Hovedstaden

Appendix 7: Management of circulatory complications

Hypotension:

Propofol decreases myocardial contractility and is a vasodilator. The impact on the circulation is most noticeable in older people and patients with heart disease.

If systolic blood pressure is below 80:

- Ephedrine 5-10 mg i.v. Can be repeated after 5 minutes
- Place patient in Trendelenburg position.
- Patients must also be observed for changes in heart rate or arrhythmia.

NB: Inability to record blood pressure using automatic blood pressure monitoring equipment during sedation may be due to equipment failure, but the usual cause is hypotension. If a strong peripheral pulse can be found quickly and easily then the probable cause is equipment failure , otherwise this situation must always be treated as hypotension so that no time is wasted on identifying the problem.

Bradycardia:

Reflex bradycardia in connection with endoscopy or as a rare side effect of administration of propofol.

In the event of prolonged bradycardia (heart rate < 40 bpm) the following can be given:

Atropine: 0.5 mg IV, which can be repeated after 5 minutes

Cardiac arrest:

Increase supplemental oxygen, call cardiac arrest

Region Hovedstaden

Appendix 8: Training of nurses and doctors in the management of propofol sedation in connection with gastroenterological and endoscopic procedures

The objective of these guidelines is to standardise the training and education of non-anaesthetically-trained doctors and nurses in propofol sedation of patients undergoing endoscopic procedures in the Capital Region of Denmark.

The education and training of both doctors and nurses must consist of theoretical instruction and practical management of propofol as monotherapy. The recommendations are derived from existing evidence, recommendations in literature, together with national and international guidelines.

Instruction/training of doctors:

The instruction applies to all doctors who will be performing endoscopy on patients without administering propofol sedation themselves. The instruction will consist of:

Practical and theoretical NAPS course for doctors

- Observation of NAPS (½ day)
- Performance of propofol sedation under supervision, bedside instruction (½ day)
- 4 hours of theory (same course as for nurses)
- 1 day of practical training in airway management with anaesthetic nurse
- Simulator training with theory and practical exercises in the management of complications

Final multiple-choice written examination (1 hour)

Total: Approx. 3 days of tuition.

The objective of training doctors performing endoscopy procedures in the management of propofol sedation

Doctors performing endoscopy on patients sedated with propofol by non-anaesthetists must be introduced to NAPS and be familiar with the method and the allocation of responsibility and tasks related to NAPS. Before assuming unaided responsibility for NAPS sedation, the doctor must participate in a "NAPS course for doctors", document practical skills in airway management supervised by anaesthetics staff, observe NAPS sedation and be thoroughly familiar with contraindications and the selection of patients for NAPS as well as current guidelines and instructions.

Practical and theoretical NAPS course for nurses:

Endoscopy nurses who are required to perform propofol sedation must undergo 6 weeks of supervised theoretical and practical training. Training must take place in close collaboration with a skilled NAPS nurse and/or staff trained in anaesthetics.

The training course should conclude with simulator training with regard to management of complications, together with the final multiple-choice examination.

The first 2 weeks

- Observation of NAPS (2-3 days)
- Performance of NAPS under supervision, bedside instruction (approx. 20 patients)
- 4 hours of theory
- 1 day of practical training in airway management with anaesthetic nurse

The last 4 weeks

- 4 weeks of unassisted NAPS on selected patients in close cooperation with NAPS instructor
- Simulator training with theory and practical exercises in the management of complications
- Final multiple choice written examination

Objective

The aim of the course is to provide doctors and nurses with the theoretical and practical knowledge required to be able to perform NAPS for gastroenterological endoscopic procedures.

Objectives of theoretical instruction

- Course participants must be familiar with relevant literature in the field, including basic guidelines for the administration of propofol sedation
- Participants must be able to explain the anatomy and physiology of the heart and pulmonary circulation, including an understanding of the definitions of hypoxia, hypocapnia and hypercapnia.
- Participants must be aware of, and be able to explain, the configuration of a normal ECG and be able to explain the most common ECG derivatives.
- Participants must be able to plan a NAPS procedure by reviewing patient-related documents and taking into account supplementary, relevant information from the patient.
- Participants must be aware of the pharmacological properties of propofol and be able to link these to knowledge of the patient's current status.
- Participants must be aware of the department's guidelines for observation of the patient following sedation
- Participants must be aware of the department's guidelines for documentation. Participants must be thoroughly familiar with procedures for selecting patients for NAPS as well as the department’s guidelines for contraindications to NAPS sedation.

Objectives of practical skills

- Course participants must be aware of the patient categories that are not suitable for NAPS. Participants must be able to plan and perform nursing care when patients are admitted so that care is adapted to suit the needs and resources of the individual patient
- Participants must be able to use and prepare the department’s monitoring equipment for NAPS sedation

- Participants must be able to position the patient in order to prevent discomfort or injury. Participants must be able to state the reasons for deliberations about the position based on theoretical knowledge and knowledge of the department's guidelines.
- Participants must be able to apply their knowledge to ensure clear airways and be able to act in an appropriate manner based on the theoretical knowledge and practical skills acquired
- Participants must be able to administer propofol sedation, taking into account the pharmacological properties of propofol, the patient's current status and the nature of the examination
- Participants must be familiar with and be able to use the department's documentation and thereby participate in the quality assurance of NAPS. Participants must be familiar with the safety and legal aspects of sedation
- Participants must be able to plan, perform and state reasons for individually-adapted nursing tasks associated with a procedure involving sedation
- Participants must be able to admit, observe and discharge patients following NAPS sedation without assistance.
- Participants must be able to explain considerations associated with post-sedation based on theoretical knowledge and the department's guidelines. Participants must be able to respond appropriately to complications occurring during the post-sedation process

Simulation training for NAPS course participants (doctors and nurses)

Simulation training enables participants to practice realistic, everyday scenarios at no risk to patients. All NAPS nurses and doctors are required to participate in simulation exercises during the training course. Exercises cover the more complex procedures relating to airway complications.

Objective

- To hone the skills of NAPS course participants before they assume unaided responsibility for patients.
- To ensure a high level of patient safety and thereby reduce the number of adverse events.

Tuition consists of theory and subsequent simulation training.

Practical instruction and training of skills must reflect the theoretical instruction.

Learning objectives related to simulation training

Criteria for selection of patients for NAPS

Patient assessment (ASA class, airway assessment, contraindications)

ABCDE principles,

Communication as a tool in acute situations

Region Hovedstaden

Airway management,

- How to maintain a patent airway
- Using a tongue blade and nasal airway
- Mask ventilation, positive-pressure ventilation
- Performing controlled and assisted manual ventilation
- Treatment standards in the event of complications.