

Irish Society of Conscious Sedation in Dentistry



Sedation for the older person

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A survey to assess the provision of conscious sedation by general dental practitioners in the Republic of Ireland

Fisher, Stassen and Nunn, JOURNAL OF THE IRISH DENTAL ASSOCIATION
April/May 2011 100: VOLUME 57 (2)

Almost 2 years on...

Where are you now?

Irish Society of Conscious Sedation
in Dentistry



Anxiety - does it improve as we get older?



- Prevalence of fear and anxiety well documented
 - Common in all cultures
 - Often originates in childhood and **persists through life**
 - Avoidance leads to poorer oral health
-
- 19 studies conclude anxiety remains stable over 50 years

Balancing efficacy and safety in the use of oral sedation in dental outpatients

Dionne R et al. *JADA April 2006 137(4): 502-513*

‘One of the measures of a civilised society is how well it looks after the most vulnerable members of its society’

Professor Sir Bruce Keogh, Medical Director of the NHS

Enhancing quality of life for people with long-term conditions

DoH Nov 2012



‘One in three people are living with at least one chronic condition, such as hypertension, diabetes or depression.

By 2018 nearly three million people, mainly older people, will have three or more conditions all at once’.

The Mandate

Enhancing quality of life for people with long-term conditions: Key areas where progress will be expected (Part two of the NHS Outcomes Framework)
<i>Overarching Indicator</i>
2 Health related quality of life for people with long-term conditions
<i>Improvement areas</i>
Ensuring people feel supported to manage their condition
2.1 Proportion of people feeling supported to manage their condition
Improving functional ability in people with long-term conditions
2.2 Employment of people with long-term conditions
Reducing time spent hospital by people with long-term conditions
2.3.I Unplanned hospitalisation for chronic ambulatory care sensitive conditions (adults) (Chronic ambulatory care sensitive conditions are those where the right treatment and support in the community can help prevent people needing to be admitted to hospital.)
2.3.II Unplanned hospitalisation for asthma, diabetes and epilepsy in under 18s
Enhancing quality of life for carers
2.4 Health-related quality of life for carers
Enhancing quality of life for people with mental illness
2.5 Employment of people with mental illness
Enhancing quality of life for people with dementia
2.6.I Estimated diagnosis rate for people with dementia
2.6.II A measure of the effectiveness of post-diagnosis care in sustaining independence and improving quality of life

What if the patient is anxious?

How can oral function improve?

‘The NHS Commissioning Board’s objective is to ensure that CCGs work with local authorities to ensure that vulnerable people, particularly those with learning disabilities and autism, receive **safe, appropriate, high quality care**’.

Delivering Dignity

Recommendation 34 – providers of education and training

Local
Government
Association

NHS CONFEDERATION

ageUK
Improving later life

Delivering Dignity

Securing dignity in care for older
people in hospitals and care homes



‘To reflect the fact that older people make up the majority of patients, universities, service providers and professional bodies should ensure that student placements in hospitals provide a strong grounding in the care of older people.

Clinical networks and clinical senates – new professional bodies created under the 2012 Health and Social Care Act – must ensure that dignity is reflected in all their work’

Is your patient too old for sedation?

What are the alternatives ?

- Cognitive +/- behavioural management techniques + LA
- Atraumatic Restorative Techniques
- Palliative care

Why not sedation ?

- Risks and benefits

Would GA be better?

- Risks and benefits

Definition of older age



Anaesthesia and Peri-Operative Care of the Elderly

Published by
The Association of Anaesthetists of Great Britain and Ireland
Telephone: 020 7631 1650, Fax: 020 7631 4352
E-mail: info@aagbi.org Website: www.aagbi.org

December 2001

- People over 65 years of age have conventionally been regarded as elderly and this is still used as a social definition.
- For the purpose of this document **the elderly are defined as over 80 years of age, based on physiological parameters.**
- The older a patient is on presentation for surgery, the greater is their risk of morbidity and mortality

Due for revision 2007

Royal College of Surgeons of England Guidelines for Day Case Surgery 1992

- ASA I & II
- upper age limit 65-70 years based on biological rather than chronological age
- operation time < 60 min: if > unsuitable

5 Conscious Sedation for Adults and Children with Special Needs

This section of the guidance must be considered in conjunction with the preceding sections and is generally applicable to adults and children whose disabilities affect the provision of their dental care.



Conscious sedation for such patients must be provided only by those who are experienced in sedating people with special needs and where the appropriate equipment and facilities are available.



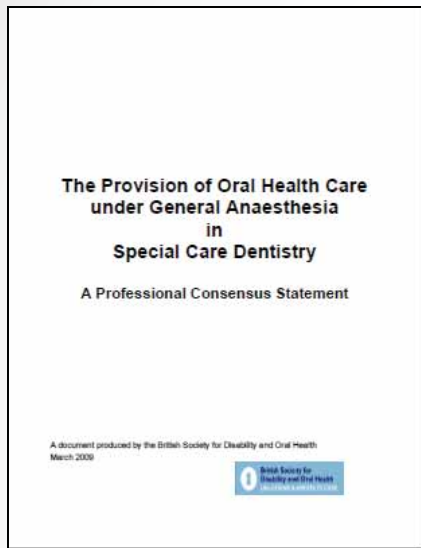
The patient's response to their environment and to interventions may vary, influenced by such factors as their degree of cognitive ability and cooperation and the influence of their medical history on the proposed treatment. Corresponding adaptations in treatment protocols may be required: for example, pre-operative recording of physiological data or intra-oral examination may not be possible. In such cases, reasons for deviations from standard practice should be recorded.

4

It can be difficult to judge the level of sedation in patients who are unable to respond well to verbal communication. Despite this, the level of sedation must not go beyond the definition of conscious sedation (Section 1.3).

4

GA



Indications for General Anaesthesia
'A clear inability to co-operate with the provision of dental care using other patient management techniques including sedation (or contraindications to the use of sedation)'.

Clinical Guidelines and Integrated Care Pathways for the Oral Health Care of People with Learning Disabilities 2012

<http://www.bsdh.org.uk/guidelines.html>



Limitations with GA

- Is the patient fit enough?
- Time factors
- Limited treatment options / compromise
- Is this safe, appropriate high quality care?

Equality Act 2010

Ban on age discrimination in provision of services and public functions (implementation 1 October 2012).

Health and Social Care

- Age based treatment criteria removed
- **Access to care determined on the basis of need**
- No specific exceptions to ban on age discrimination for health or social care services.

<http://www.homeoffice.gov.uk/equalities/equality-act/age-discrimination>

What is Conscious Sedation?

‘A technique in which the use of a drug or drugs produces a state of depression of the central nervous system enabling treatment to be carried out, but during which verbal contact with the patient is maintained throughout the period of sedation.

The drugs and techniques used to provide conscious sedation for dental treatment should carry a margin of safety wide enough to render loss of consciousness unlikely’.

Standing Dental Advisory Committee 2003 , General Dental Council 2005



Dental Council of Ireland Code of Practice 2005

SEDATION- Definition

- Simple dental sedation is a carefully controlled technique in which a single intravenous drug or a combination of oxygen and nitrous oxide is used to reinforce hypnotic suggestion and reassurance in a way, which allows dental treatment to be performed with minimal psychological stress.
- Verbal communication with the patient should be maintained at all times throughout the procedure and it is essential that the protective pharyngeal and laryngeal reflexes remain intact at all times, and that the patient breathes spontaneously without respiratory obstruction.
- The technique must carry a margin of safety wide enough to render unintended loss of consciousness unlikely..
- Where intravenous sedation is employed a dentist may assume the responsibility of sedating the patient as well as operating, provided that the dentist has successfully completed a Dental Council recognised postgraduate training programme in the administration of intravenous sedation. A second appropriate person should be in attendance.

'The Code of Practice of the Dental Council of Ireland for sedation is less prescriptive but is legally more binding. Any dental surgeon practising outside the Code of Practice is liable to a charge of professional misconduct'

Fisher et al. J Irish Dental Association 2011

Think in context of the older person

- 'It is of fundamental importance that the level of sedation must be such that the **patient remains conscious**, and is able to both understand and **respond to verbal commands**.
- If a patient is unable to respond to verbal contact when fully conscious, their **usual method of communication must be maintained**.
- Any technique resulting in the loss of consciousness is defined as general anaesthesia, and in UK 'deep sedation' is considered within this category'.
- **Same in Ireland ?**

Is decision making in sedation -more challenging for older people ?

- Identify options
- Balance risks
- Choose sedation technique
- Manage unexpected outcomes
 - Sedation
 - Medical
 - Dental

MORE TO CONSIDER



Assessment



What do you know about me ?

A man in a suit and tie is standing behind a large, dark gray rectangular sign. The sign is held up by two hands at the top corners. The man is smiling and looking towards the camera. The background is a plain, light-colored wall.



Who am I ?

The same man from the previous image is standing behind a smaller, dark gray rectangular sign. He is holding the sign with both hands in front of his chest. The background is the same plain, light-colored wall.

Does the patient need sedation ?

Coulthard et al. BDJ 2011;9:211(5):E10

Indicator Of Sedation Need (IOSN)

- Assesses clinical need rather than demand
- Examines 3 relevant interacting factors
 - Treatment complexity
 - Medical and behavioural complexity
 - Dental anxiety (measured with MDAS)
- Assigns score to each area based on complexity

British Association of Oral Surgeons

<http://www.baos.org.uk/resources/IOSNForm.pdf>

Indicator of Sedation Need (IOSN)

ANXIETY QUESTIONNAIRE TO BE COMPLETED BY THE PATIENT

Can you tell us how anxious you get, if at all, with your dental visit?

Please indicate by putting a 'X' in the appropriate box

1. If you went to your Dentist for TREATMENT TOMORROW, how would you feel?

Not Anxious ☐ Slightly Anxious ☐ Fairly Anxious ☐ Very Anxious ☐ Extremely Anxious ☐

2. If you were sitting in the WAITING ROOM (waiting for treatment), how would you feel?

Not Anxious ☐ Slightly Anxious ☐ Fairly Anxious ☐ Very Anxious ☐ Extremely Anxious ☐

3. If you were about to have a TOOTH DRILLED, how would you feel?

Not Anxious ☐ Slightly Anxious ☐ Fairly Anxious ☐ Very Anxious ☐ Extremely Anxious ☐

4. If you were about to have your TEETH SCALED AND POLISHED, how would you feel?

Not Anxious ☐ Slightly Anxious ☐ Fairly Anxious ☐ Very Anxious ☐ Extremely Anxious ☐

5. If you were about to have a LOCAL ANAESTHETIC INJECTION in your gum, above an upper back tooth, how would you feel?

Not Anxious ☐ Slightly Anxious ☐ Fairly Anxious ☐ Very Anxious ☐ Extremely Anxious ☐

Humphreys GM, Manton T and Lindsay SJE. The Modified Dental Anxiety Scale: Validation and United Kingdom Norms. *Community Dental Health* 1995; 12:143-150.

Dentist to score Anxiety Questionnaire

Each of the five answers is scored as follows:

Not anxious = 1
Slightly anxious = 2
Fairly anxious = 3
Very anxious = 4
Extremely anxious = 5

So the total Questionnaire Score is a sum of all five items (range 5 to 25)

Indicator of Sedation Need (IOSN)

MATRIX TO BE COMPLETED BY THE DENTIST

1. Anxiety Questionnaire (MDAS) Rank Score

Questionnaire Score is converted to Rank Score

Please circle one

MDAS 5-9 (minimal anxiety)
MDAS 10-12 (moderate anxiety)
MDAS 13-17 (high anxiety)
MDAS 18-25 (very high anxiety)

1
2
3
4

2. Medical & Behavioural Indicator Rank Score

Please circle one

No medical or behavioural indicators

1

Systemic disorders (not of severity to exclude sedation) that may be exacerbated by treatment
Fainting attacks/ hypertension/ angina/ asthma/ epilepsy/ other (please state)

Systemic disorders that compromise ability to cooperate

Arthritis/parkinsonism/ multiple sclerosis/ other (please state)

As a rule of thumb ASA II would generally be 2 or 3 and an ASA III would result in a grade of 4

Gag reflex

2, 3, or 4

These indicators are not designed to replace your usual full medical history

3 Treatment Complexity Rank Score

Please circle one

This guidance is not exhaustive - if in doubt about score then please score higher value

ROUTINE - Scale, single rooted extraction of 1 or 2 teeth, small soft tissue biopsy, single quadrant restorations, crown preparations or anterior endodontic treatment

1

INTERMEDIATE - Scale and root planning, multi-rooted tooth extraction, surgical extraction without bone removal, apicectomy anterior tooth, 2 quadrant restorative, posterior endodontic treatment

2

COMPLEX - Periodontal surgery, surgical extraction with bone removal, apicectomy posterior tooth, multiple quadrant restorative, multiple posterior endodontics

3

HIGH COMPLEXITY - Any treatment considered more complex than above or are multiples of the above

4

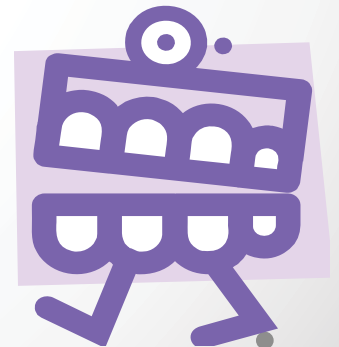
SEDATION NEED 1 + 2 + 3 scores

Total Rank Score	Source Descriptor	Sedation Need
3-4	Minimal need	No
5-6	Moderate	No
7-9	High need	Yes
10-12	Very high need	Yes

Treatment planning

‘The decision to use conscious sedation in the care of people with learning disabilities is influenced by a number of factors, including:

- Age
- Medical condition and medication
- Cultural acceptance of sedation
- Behaviour management problems
- Support from family and/or carers
- Experience and training of the dental team’



Care Settings

- ‘The appropriate use of different drugs and techniques either in the primary or hospital dental service
- Quality assurance in delivery of safe patient care is essential and development of integrated referral centres ... an extended range of techniques, including alternative techniques, based on local needs, is recommended
- This would allow patients with a learning disability to receive appropriate and expert management for conscious sedation techniques’.

(Royal College of Anaesthetists, 2007)

Same for older people ?

PHARMACOLOGY

PHARMACOKINETICS

=

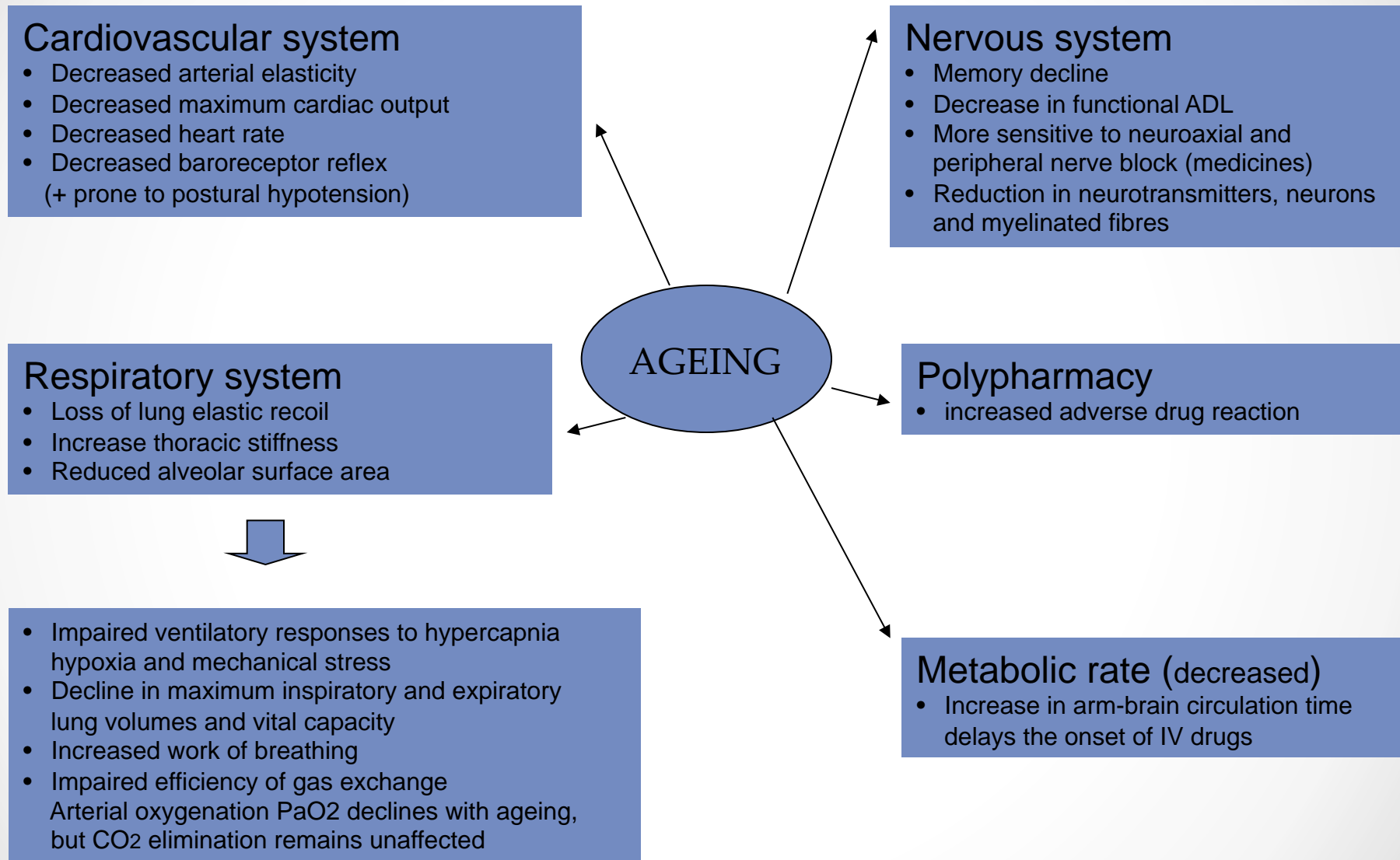
BIOAVAILABILITY AND
PROCESSING BY THE BODY

PHARMACODYNAMICS

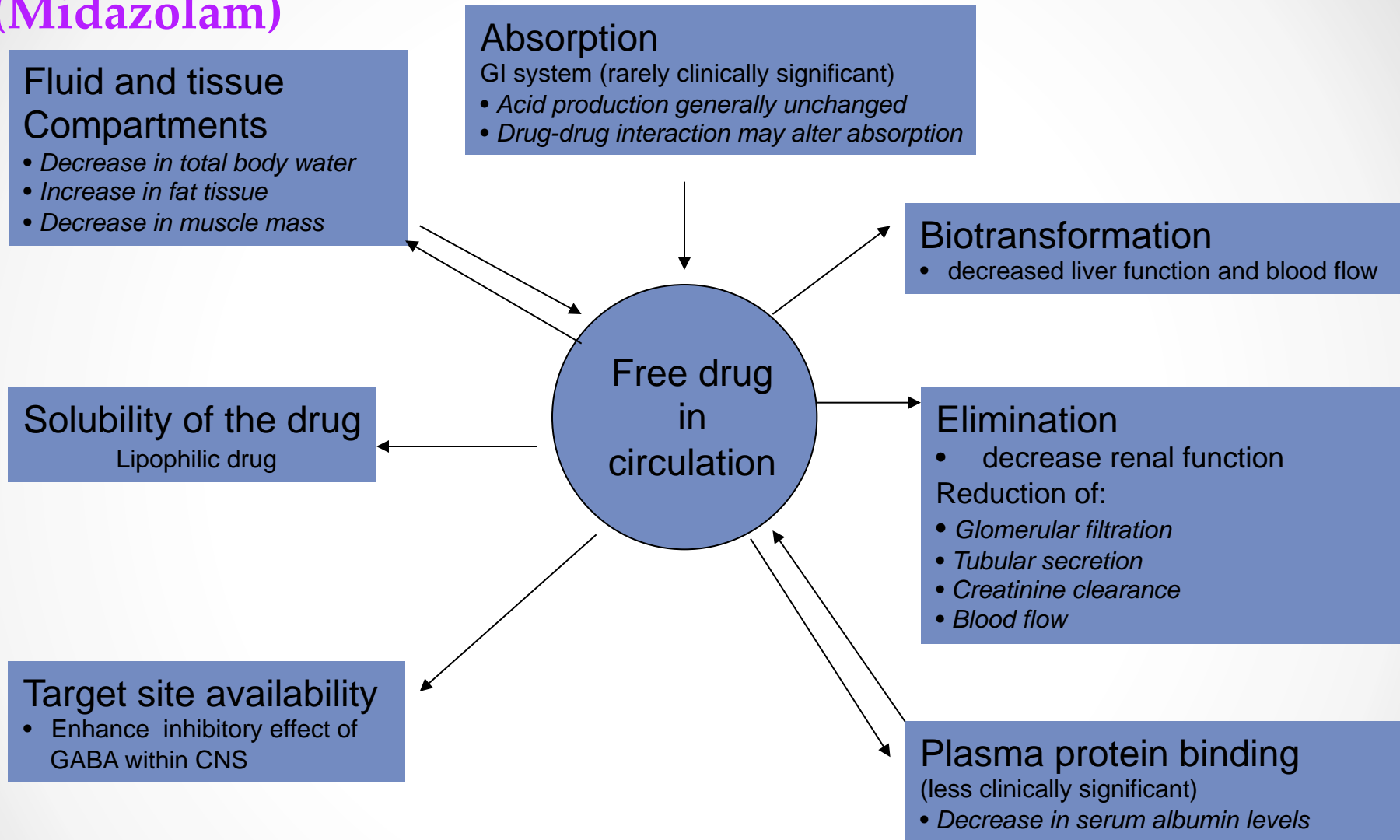
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THE EFFECT OF THE DRUG
ON THE PATIENT

Anatomical and functional changes in older patients



Physiological changes with age affecting pharmacokinetics (Midazolam)



Acknowledgement: I Godhino, Certificate assignment, Cardiff University 2011

BNF 64 September 2012 xiii

Minimising harm in patients with co-morbidities

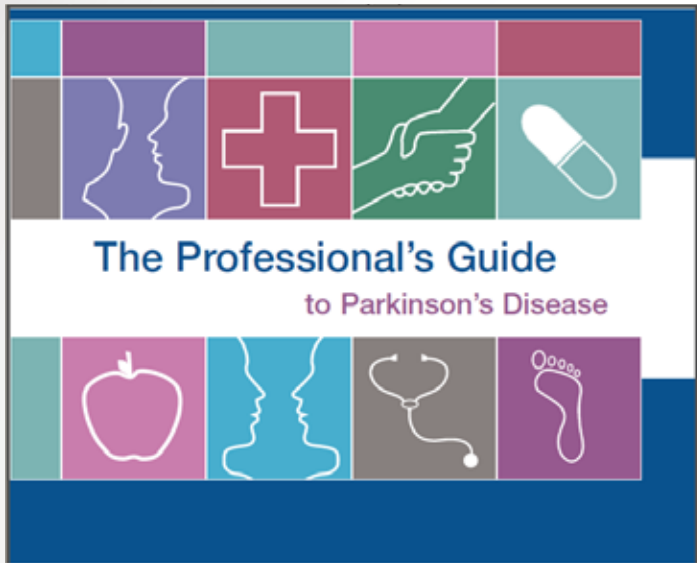
‘Drug chosen to treat a particular condition should have minimal detrimental effects on the patient’s other diseases and minimise the patient’s susceptibility to adverse effects’

Cautions, Contraindications and Side Effects

Use to assess risk...

- if a safer alternative cannot be found drug may be prescribed while monitoring patient for adverse-effects or deterioration in co-morbidity
- impact of potential side effects on a patient’s quality of life

Parkinson's disease



http://www.parkinsons.org.uk/pdf/B126_Professionalsguide.pdf



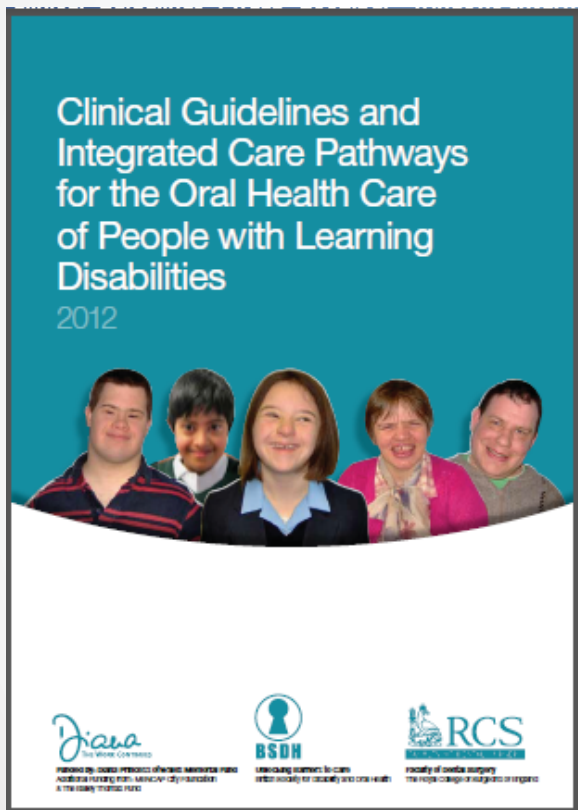
- 'Although relative analgesia or intravenous sedation may help to control tremor, they may exacerbate the risk of aspiration as they depress the swallow reflex, which is already impaired in PD sufferers'
- Do not recline patient more than 45°
- Rubber dams, additional suction, four- handed dentistry and high-volume suction'

Parkinson's Disease and Oral Care

Fiske J, Hyland K *Dent Update* 2000; 27: 58-65

**BUT -with care and good teamwork
can use sedation to good effect**

Older people with Learning Disabilities

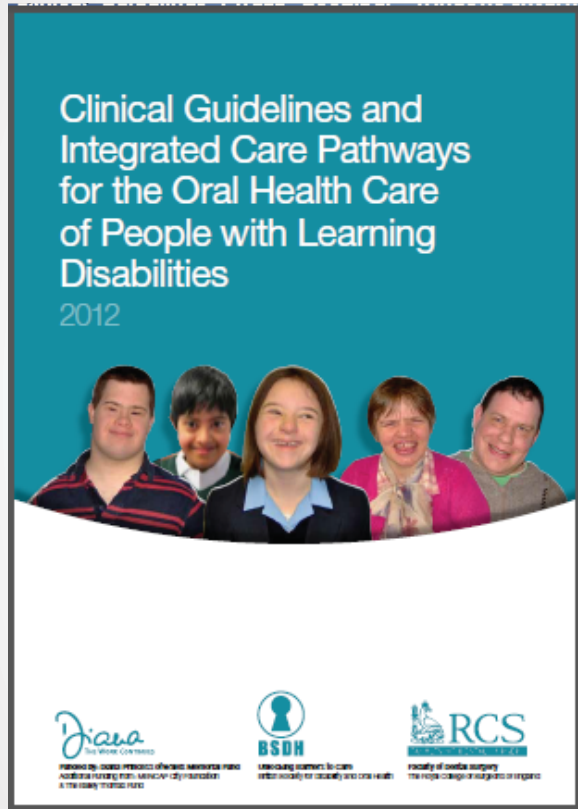


‘Older people with learning disabilities may face barriers associated with ageing...

They may also suffer from cognitive, mental and medical problems associated with advancing age.

...Their rights to oral health and appropriate oral care services must not be overlooked’.

Adults and Older People



'..a variety of conscious sedation techniques have been used successfully for adults **and older people** without any definitive conclusion about which drug or method of conscious sedation is the most effective.

'..stress the importance that healthcare professionals who deliver sedation must have **appropriate training**, to ensure that their knowledge and skills are kept up to date through continuing professional development'

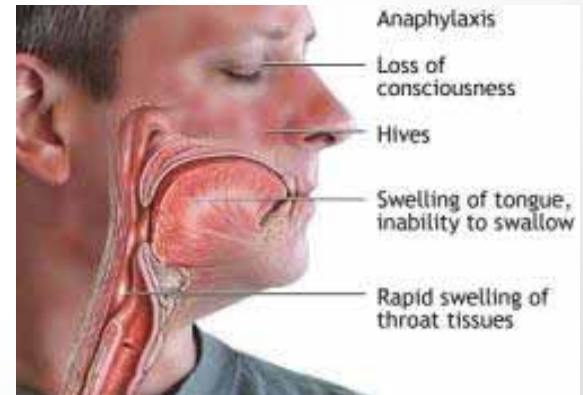
Sedation for older patients

- extra responsibility

- Need competent sedationist and dental nurse with knowledge, skills and attitudes
- Careful assessment and treatment planning of patient and care setting
- Consideration of consent and capacity issues
- Monitoring
- Care before, during and discharge after treatment

Staff Training

- Conscious sedation protocol for older people
- Manual handling / clinical holding
- Immediate Life Support (Resuscitation Council UK)
- Medical emergencies training in Simulation Centres
 - sedation related complications



Do I have the right facilities ?



What else do I need?





Assessment SCDEP 2012

- 'Whenever possible an oral examination and treatment planning should be undertaken as part of assessment.
- Blood pressure recording is part of assessment process for all patients having intravenous, oral or transmucosal sedation, unless lack of patient compliance renders pre-sedation measurement impossible.
- ASA status must be determined and recorded.

Specialist advice should be sought if there is doubt about the impact of patient's physical status on their sedation'.



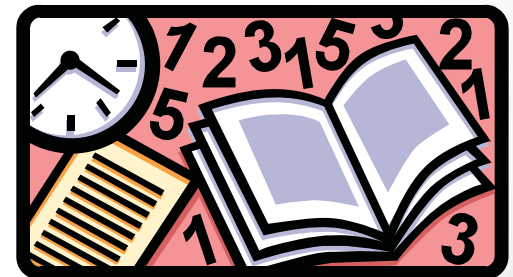
Conscious Sedation for Adults and Children with Special Needs SCDEP 2012

- ‘Conscious sedation for such patients must be provided only by **those who are experienced in sedating people with special needs** and where the appropriate equipment and facilities are available.
- The patient’s response to their environment and to interventions may vary, influenced by such factors as their degree of cognitive ability and cooperation and the influence of their medical history on the proposed treatment.’



Pre-assessment clinics

- Weight /Height
- Body mass index
BMI
- Blood pressure
- Written instructions
- Fasting
- Drug timings
- Capacity / consent
- Social circumstances
- Escort
- Transport home



ASA Physical Status Classification System

ASA Physical Status 1 - A normal healthy patient

ASA Physical Status 2 - A patient with mild systemic disease

ASA Physical Status 3 - A patient with severe systemic disease

ASA Physical Status 4 - A patient with severe systemic disease that is a constant threat to life

ASA Physical Status 5 - A moribund patient who is not expected to survive without the operation

ASA Physical Status 6 - A declared brain-dead patient whose organs are being removed for donor purposes

- <http://www.asahq.org/Home/For-Members/Clinical-Information/ASA-Physical-Status-Classification-System>

ASA II

- patient with mild systemic disease

e.g. well controlled type II NIDD, epilepsy, asthma, thyroid disease

- can walk 2 level blocks or climb flight of stairs, but must rest at end -because of some distress
- **healthy older patient > 60 years**
- healthy pregnant woman
- drug allergy or atopic patient
- healthy but extreme anxiety or phobic patient
- **suitable for treatment under LA + sedation in primary care**
- may need to limit duration of treatment and liaise with GMP
- **yellow light -caution**



ASA III

- patient with severe systemic disease that limits activity but is not incapacitating

- can climb flight of stairs or walk 2 level city blocks but must stop (at least once) before reaching goal - because of distress
- does not show signs or symptoms of distress at rest, but develops with stress
- stress reduction and liaison with GMP

Sedation in Secondary care setting

- decrease length of treatment

yellow light -proceed with caution



Relationship of BP to fitness for dental treatment

BP(mmHg)	ASA	Considerations
• <140/<90	I	routine dental care
• 140-160 / 90-95	II	recheck BP pre-op otherwise routine Rx
• 160-200 /95-114	III	recheck after 5 mins, medical assessment
• >200 / >115	IV	no treatment, temporise until BP controlled

Assessment of anxious, older, obese patients?

- Airway management
- Access issues
- Risk of co-morbidities: Diabetes type II, CVS, respiratory, hypertension
- Medical emergency risk

Academy of Medical Royal Colleges

www.aomrc.org.uk

MEASURING UP

THE MEDICAL PROFESSION'S PRESCRIPTION
FOR THE NATION'S OBESITY CRISIS

February 2013

[BBC NEWS](#) 15 February 2013

[Doctors Unite to deliver 'prescription' for UK Obesity epidemic](#)

- Medical professionals have set out their recommendations for tackling obesity
- **Measuring up:** the medical profession's prescription for the nation's obesity crisis follows a 6-month inquiry

OSA (Obstructive Sleep Apnoea)

OHS (Obesity hypoventilation syndrome)

Strong association with obesity > 55% of morbidly obese

- Neck circumference >17" > risk of OSA
- Heavy snorers
multiple apnoeas (>5 episodes/hour and 40 in 8 hours) or hyponeas
- Systemic complications
dysrhythmias, systemic and pulmonary hypertension, GORD reflux, excess sweating
- PaO₂ can go low enough to cause cardiac arrest (supine)



Correlating BMI and waist circumference

BMI classification	Waist circumference		
	Low	High	Very high
Normal weight (18.5 to less than 25kg/m ²)	No increased risk	No increased risk	Increased risk
Overweight (25 to less than 30kg/m ²)	No increased risk	Increased risk	High risk
Obesity I (30 to less than 35kg/m ²)	Increased risk	High risk	Very high risk
Obesity II (35 to less than 40kg/m ²)	Very high risk	Very high risk	Very high risk
Obesity III (40kg/m ² or more)	Very high risk	Very high risk	Very high risk

Source: NICE guidelines²

BMI range of 25-35

- + waist circumference of > 40" (102cm) in men or
- + waist circumference of > 35" (88cm) in women
- = **High risk of morbidity and mortality**



STOP-BANG

5% Obesity III patients present with OSA

Associated risks:

- Collar >16.5 inches
- Evening alcohol consumption
- Pharyngeal abnormalities

S	Snoring: Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?	Y	N
T	Tired: Do you often feel tired, fatigued or sleepy during the daytime?	Y	N
O	Observed: Has anyone observed you stop breathing during your sleep?	Y	N
P	Blood pressure: Do you have or are you being treated for high blood pressure?	Y	N

Table 2. STOP questionnaire. High risk of OSA = answering yes to 2 or more questions. Adapted from Chung F, et al. Anesthesiology. 2008;108:812-21. Reprinted with permission from Wolters Kluwer Health.

S	Snoring: Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?	Y	N
T	Tired: Do you often feel tired, fatigued or sleepy during the daytime?	Y	N
O	Observed: Has anyone observed you stop breathing during your sleep?	Y	N
P	Blood pressure: Do you have or are you being treated for high blood pressure?	Y	N
B	BMI: BMI more than 35 kg/m ²	Y	N
A	Age: Age over 50 years	Y	N
N	Neck circumference: Neck circumference greater than 40 cm	Y	N
G	Gender: Male	Y	N

Table 3. STOP-Bang scoring model. High risk of OSA = answering yes to 3 or more items. Adapted from Chung F, et al. Anesthesiology. 2008;108:812-21. Reprinted with permission from Wolters Kluwer Health.

STOP-BANG score

STOP-BANG score ≥ 3 high sensitivity detecting OSA

- Apnoea: pauses in breathing for at least 10 seconds, associated with decreased blood oxygenation
- Apnoea-hyponea index
 - number of apnoea events / number of hours of sleep
 - >5 : mild OSA
 - >15 : moderate OSA
 - >30 : severe OSA
- Probability of OSA greater as STOP-BANG score increases

Cardiovascular risk



- Systemic hypertension
 - mild-moderate 50-60% in obese patients
 - severe in 5-10%
- Blood pressure monitoring
 - pre- and post-operatively (SDCEP, 2012)
- Every 10kg weight gain
 - systolic BP increases by 3-5mmHg, diastolic BP by 2mmHg
- Every increment of 1 in BMI
 - risk of heart failure- increases 5% in men and 7% women

Oral care for patients with cardiovascular disease and stroke

Rose et al. JADA, Vol. 133, June 2002

‘Researchers have suggested that the use of conscious sedation to decrease stress and therefore minimize endogenous release of epinephrine may be a more important factor in ensuring hemodynamic stability in patients with cardiovascular disease than are attempts to avoid the small amount of epinephrine used in local anesthetic Injections’.

Inhalation sedation

- Simple effective technique
- Good for all ages
- Carefully titrated to patient's response
- Fail safe device
 - No less than 30% O₂



Inhalation sedation



- Nitrous oxide is sympathomimetic and increases systemic vascular resistance
- Does not cause a decrease in blood pressure
- Nitrous oxide does not produce skeletal muscle relaxation
 - Less potential for airway obstruction
- Inhalation is a good option for older people who are not suitable medically for IV sedation

Add imagery

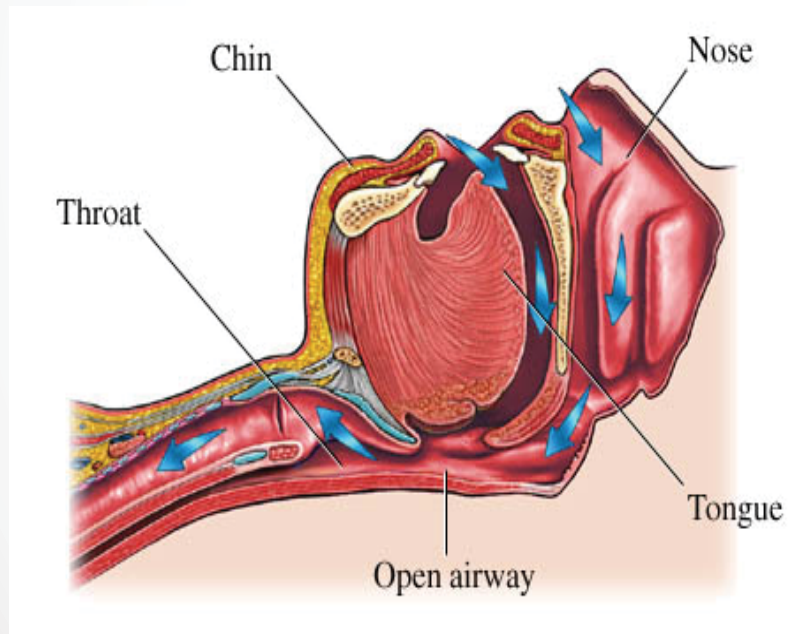


Airway assessment in older patients

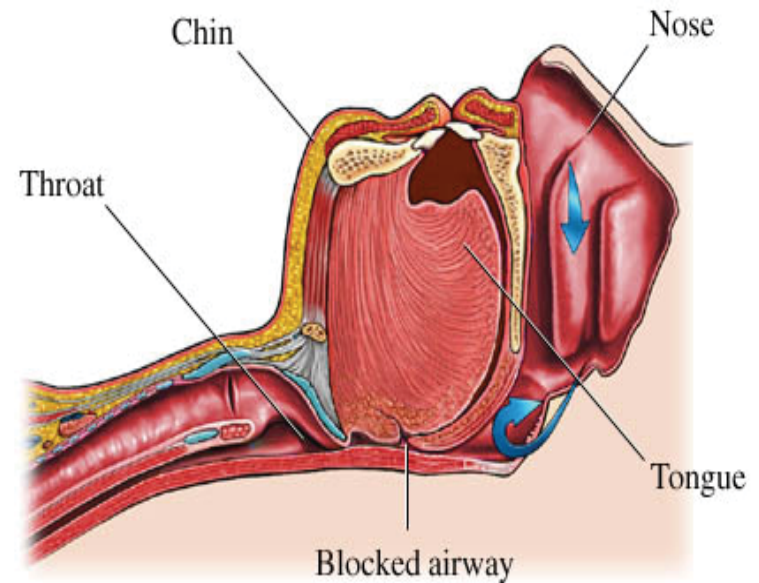
- History
 - Comorbidities
 - Previous difficult intubation or sedation
- Risk factors
 - Obesity, short neck, awkward dentition
- Examination
 - Facial deformity / scarring
 - LEMON

Sedation and the Airway

Open Airway



Obstructed Airway



LEMON

Manual of emergency airway management (Lipincott, Williams & Wilkins) 2000 : 31 – 39

Can an airway assessment score predict difficulty at intubation? Emerg Med J: 2005; 22 : 99 – 1021

L **look** externally

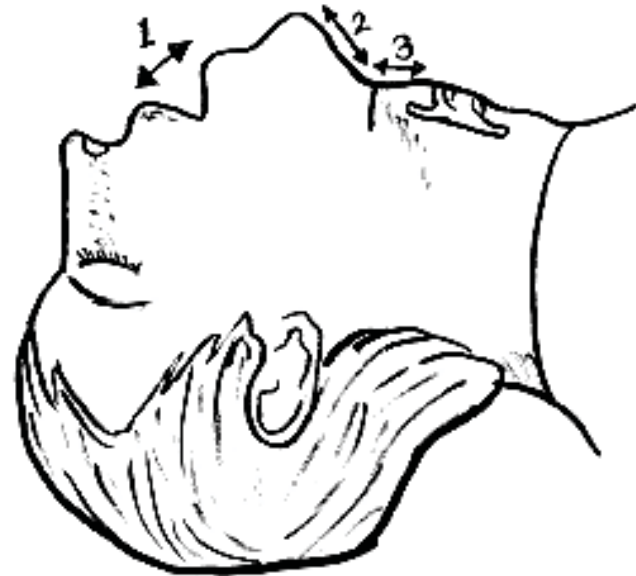
E **evaluate** “3-3-2”

1. Interincisor
2. Hyoid-mental and
3. Thyroid-mouth distances

M **mallampati**

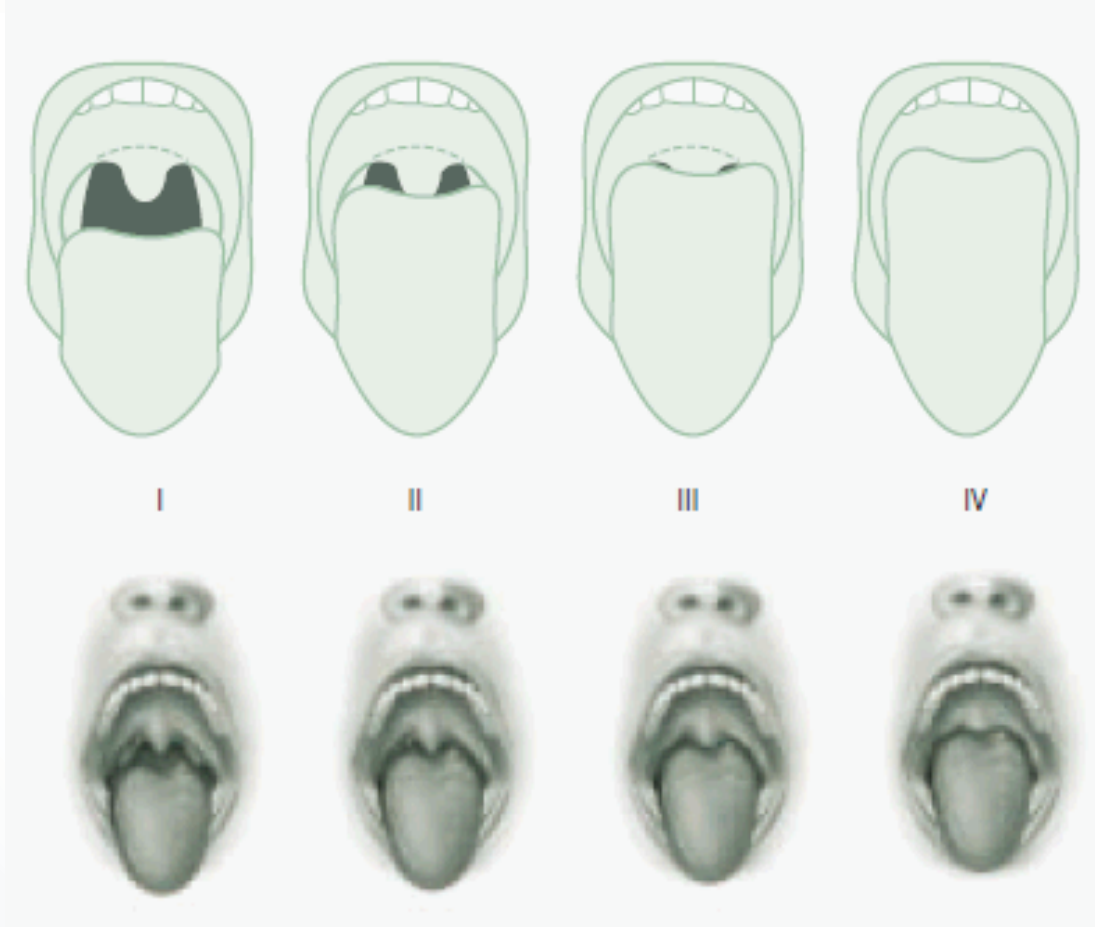
O **obstruction**

N **neck mobility** (↓)



Mallampati score

A clinical sign to predict difficult intubation. Can Anaesth Soc J : 1985 : 32: 429 - 434



Clinical observations

Pre-, peri- and post-op sedation

- Airway patency, neck extension
- Breathing- rate and depth
- Circulation- BP, peripheral perfusion, ankle oedema
- Pulse, rate and rhythm
- Depth of sedation- pre op communication
- Skin colour- pallor, cyanosis
- Blood glucose levels?
- Weight- obesity?



IV sedation Cannulation

- **Age**
 - thin, fragile
 - < connective tissue
- **Condition/ past use**
 - thrombosed/ fibrosed
- **Weight**
 - obese > difficult



Rapid Response Report 2008

National Patient Safety Agency

www.npsa.nhs.uk/rrr

NPSA
National Patient Safety Agency

Rapid Response Report

NPSA/2008/RRR011
From reporting to learning 9 December 2008

Reducing risk of overdose with midazolam injection in adults

Issue
Some adult patients are being overdosed with midazolam injection when used for conscious sedation. The presentation of high strength midazolam as 5mg/ml (2ml and 10ml ampoules) or 2mg/ml (5ml ampoule) exceeds the dose required for most patients. There is a risk that the entire contents of high strength ampoules are administered to the patient when only a fraction of this dose is required. Doses often exceed that required, are not titrated to the patient's individual needs, do not take into account concurrent medication (e.g. opioids) and may involve high risk groups for example, the frail or the elderly. There is frequent reliance on injectable flumazenil (antagonist/reversing agent) for reversal of sedation in patients that have been over sedated.

Patient safety incidents
The NPSA has received 498 midazolam patient safety incidents between November 2004 and November 2008 where the dose prescribed or administered to the patient was inappropriate. Three midazolam related incidents have resulted in death.

Incident data suggests that the reversing agent, flumazenil, is frequently used to treat inadvertent benzodiazepine overdose and, on occasion, no account is taken for the shorter half life of flumazenil (compared to midazolam) leading to residual re-sedation.

For IMMEDIATE ACTION by an organisations in the NHS and independent sector where midazolam is used for adult conscious sedation.

The deadline date for ACTION COMPLETE is 9 June 2009

An executive director, nominated by the Chief Executive, working with the lead pharmacist and relevant medical/nursing staff should:

- 01101 Ensure that the storage and use of high strength midazolam (5mg/ml in 2ml and 10 ml ampoules; or 2mg/ml in 5ml ampoules) is restricted to general anaesthesia, intensive care, palliative medicine and clinical areas/situations where its use has been formally risk assessed, for example, where syringe drivers are used.
- 01102 Ensure that in other clinical areas, storage and use of high strength midazolam, is replaced with low strength midazolam (1mg/ml in 2ml or 5ml ampoules).
- 01103 Review therapeutic protocols to ensure that guidance on use of midazolam is clear and that the risks, particularly for the elderly or frail, are fully assessed.
- 01104 Ensure that all healthcare practitioners involved directly or participating in sedation techniques have the necessary knowledge, skills and competences required.
- 01105 Ensure that stocks of flumazenil are available where midazolam is used and that the use of flumazenil is regularly audited as a marker of excessive dosing of midazolam.
- 01106 Ensure that sedation is covered by organisational policy and that overall responsibility is assigned to a senior clinician which, in most cases, will be an anaesthetist.

To help with implementation of this RRR:
Supporting information is available at www.npsa.nhs.uk/rrr including harm evidence and links to relevant guidelines/resources. Further queries to Linda Matthews, Senior Pharmacist on lm@npsa.nhs.uk, telephone 020 7927 9690.

The NPSA has informed:

‘Some adult patients are being overdosed with midazolam injection when used for conscious sedation. The presentation of high strength midazolam as 5mg/ml (2ml and 10ml ampoules) or 2mg/ml (5ml ampoule) exceeds the dose required for most patients. There is a risk that the entire contents of high strength ampoules are administered to the patient when only a fraction of this dose is required.

Doses often exceed that required, are not titrated to the patient's individual needs, **do not take into account concurrent medication (e.g. opioids) and may involve high risk groups for example, the frail or the elderly.**

There is frequent reliance on injectable flumazenil (antagonist/reversing agent) for reversal of sedation in patients that have been over sedated’.

Administration of IV midazolam

Older patients over 60 years / or medically compromised

☆ Use 1mg / mL (2mg / 2mL ampoule)

- 0.5mg over 30 seconds, then pause for 4 minutes
- Additional increments of 0.5mg at 3-4 minute intervals until sedation is adequate
- Often need as little as 2mg midazolam
- RRR 2008 (total dose greater than 3.5mg is usually not necessary)

☆(Rapid Response Report NPSA 2008)



Monitoring SCDEP 2012

- 'It can be difficult to judge the level of sedation in patients who are unable to respond well to verbal communication. Despite this, the level of sedation must not go beyond the definition of conscious sedation.
- In the case of patients who are unable to respond to verbal contact when fully conscious, their **usual method of communication must be maintained.**
- Additional electromechanical monitoring may be indicated, for example, when treating patients with significant degrees of cardiovascular disease'.

How much midazolam is needed?

- Titrate to patient's response at each visit, assess and monitor
- Care in older patients > 60 years , lower dose may be adequate
- RRR 2008 : a total dose greater than 3.5mg may not be necessary but additional doses of 0.5 mg - 1mg may be given as necessary, titrated to individual response
- Think carefully before second ampoule

Rapid Response Report 2008

National Patient Safety Agency

www.npsa.nhs.uk/rrr

Elimination half life:

Midazolam

- 1.5-2.5 hours in adults
- **patients over 60 years may be prolonged up to 4 times**

Flumazenil

- 40-80 minutes
- **largely unaffected by age**

Supplementary oxygen

Must be available

- delays onset of hypoxemia if obstruction, hypoventilation or apnoea
- can give a false sense of security

Monitor ventilation

- auscultation of breath sounds
- observation of breathing pattern
- *Capnography*
- *Precordial stethoscope*



2 litres/min via nasal cannulae
if fall in O₂ sats by 4% and no
response to simple treatment

Medical conditions affected by
hypoxia-
epilepsy, CVA, angina, MI, CHD

Important to observe colour changes



Post-sedation review



- phone next day
- untoward events?
- follow up care
 - acclimatisation with hygienist
 - oral hygiene instruction and diet advice
 - oral care plan
 - need for future sedation?

IV midazolam does not adversely affect cognitive function recovery in geriatric patients *(Fredman et al. 1999)*

Intravenous midazolam for upper gastrointestinal endoscopy: a study of 800 consecutive cases relating dose to age and sex of patient.

[Bell](#) et al. [Br J Clin Pharmacol](#). 1987 Feb;23(2):241-3.

- Dose of IV midazolam to produce adequate sedation for upper GIT endoscopy in 800 patients
 - Dose of MDZ decreased markedly with age in both sexes
 - Highly significant correlation in both sexes between age and dose of MDZ.
- ‘ In patients over 70 years of age, dose of midazolam necessary for endoscopy is often so small that over dosage is all too easy’.

Responses to intravenous sedation by elderly patients at the Hokkaido University Dental Hospital.

Kitagawa, E. et al. (1992). *Anesth Prog.*; Vol.39:73-78.

Asian J Oral Maxillofac Surg 2002;14:209-214.

CLINICAL OBSERVATIONS

Influence of Intravenous Sedation with Midazolam on Respiratory Function and Muscle Activity in Elderly and Young Patients

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Abstract

Objective: The purpose of this study was to investigate the optimal dosage of intravenous midazolam for sedation in elderly patients and compare the amount of depression of respiratory function and skeletal muscle activity after obtaining similar sedation levels in younger patients.

Patients and Methods: Fifteen elderly patients older than 65 years (group E) and 15 patients younger than 55 years (group Y) underwent oral surgery or dental treatment with or without local anaesthesia after intravenous administration of midazolam.

Results: The optimal dose for the elderly patients was 62% that for the younger patients. The duration of depression of arterial oxygen saturation and vital capacity was more prolonged among patients in group E than in those in group Y. The number of patients whose grip strength value recovered 15 and 30 minutes after administration of midazolam was significantly smaller for group E than for group Y.

Conclusion: These results suggest that elderly people should be carefully treated with attention to the decrease in skeletal muscle activity, including respiratory and upper airway muscles, when receiving intravenous sedation with midazolam.

Key Words: Aged, Sedative, nonbarbiturate, Respiratory muscles, Hand strength



Influence of intravenous sedation with Midazolam on respiratory function and muscle activity in elderly and young patients.

Fujisawa et al. Asian J Oral Maxillofac Surg 2002;14:209-214

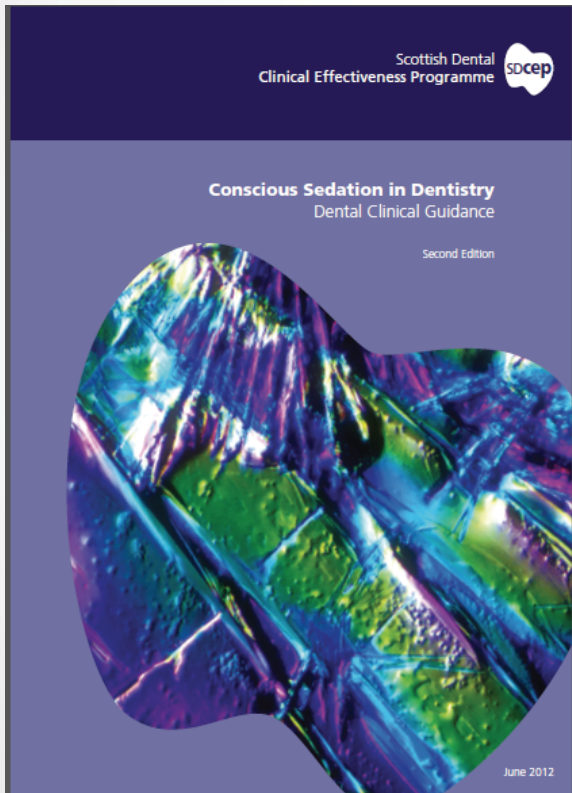
- Required dose of midazolam for older patients was 62% of that for younger patients
- Care with short procedures (monitor for at least 1 hour)
- Extend post op monitoring as slower return of SpO₂ to pre-sedative values and slower recovery rate
- Care with weight bearing and moving from surgery
 - Decrease in muscle power in limbs, respiratory, upper airway
- Care especially if more than 75 years old
- **Older patients can be treated safely at optimal dose with careful attention**

Medical emergencies



A B C D E

Clinical governance

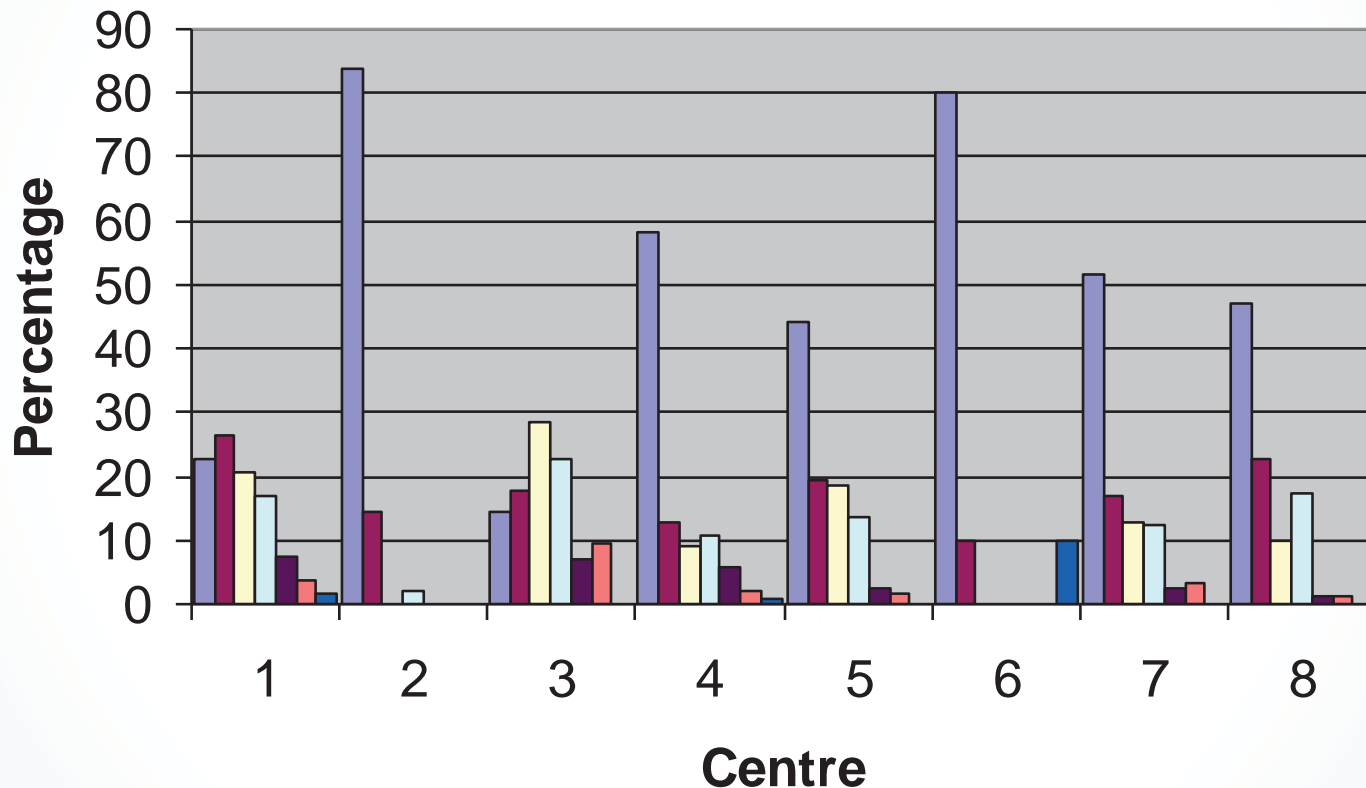


- ‘Those involved in sedation practice should regularly audit their practice.’
- System of local protocols for care and management of complications
- Positive environment of training for whole dental team.
- Clinical governance and audit procedures should **include all patient groups** being managed by dental team.
- All sedation practices should carry out adverse-event analysis.’

SE and SW Wales Multicentre Audit Group



Age Group



<21 21-30 31-40 41-50 51-60 61-70 71+

Research

Sedation and General Anaesthesia

‘Research into the administration of sedation techniques, particularly for children and older people

Research into areas of alternative medicine, which can aid the delivery of treatment e.g. Hypnosis, acting alone or as an adjunct to sedation, providing relaxation techniques’

Equality Act 2010

- 'Allowing older people a fairer and more equitable access to diagnosis and treatment at an earlier stage could improve patient outcomes over the longer term and help to improve 'Active Ageing' and independent living.

<http://www.homeoffice.gov.uk/equalities/equality-act/age-discrimination>

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Dental Sedation Teachers Group

Symposium 14th May 2013

Simulation in Conscious Sedation

Education, Teamwork and Practice

- Millennium Stadium, Cardiff, Wales
- Registration forms on www.dstg.co.uk
- 5 CPD points

Thank you for listening !