Nurse-led Post-operative Recovery

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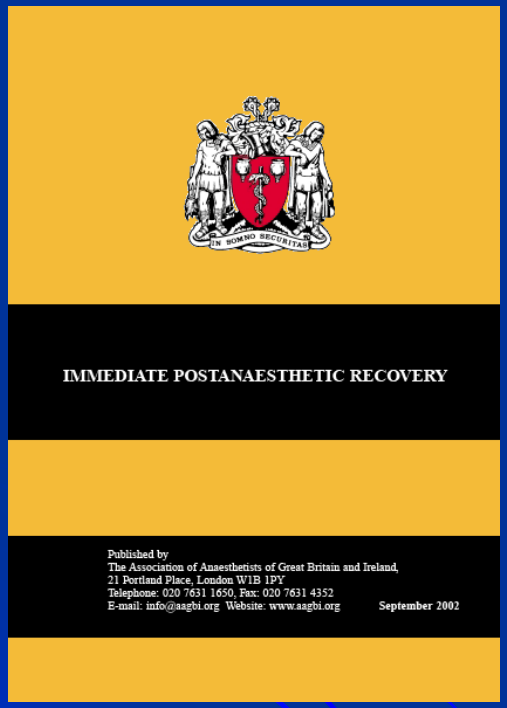
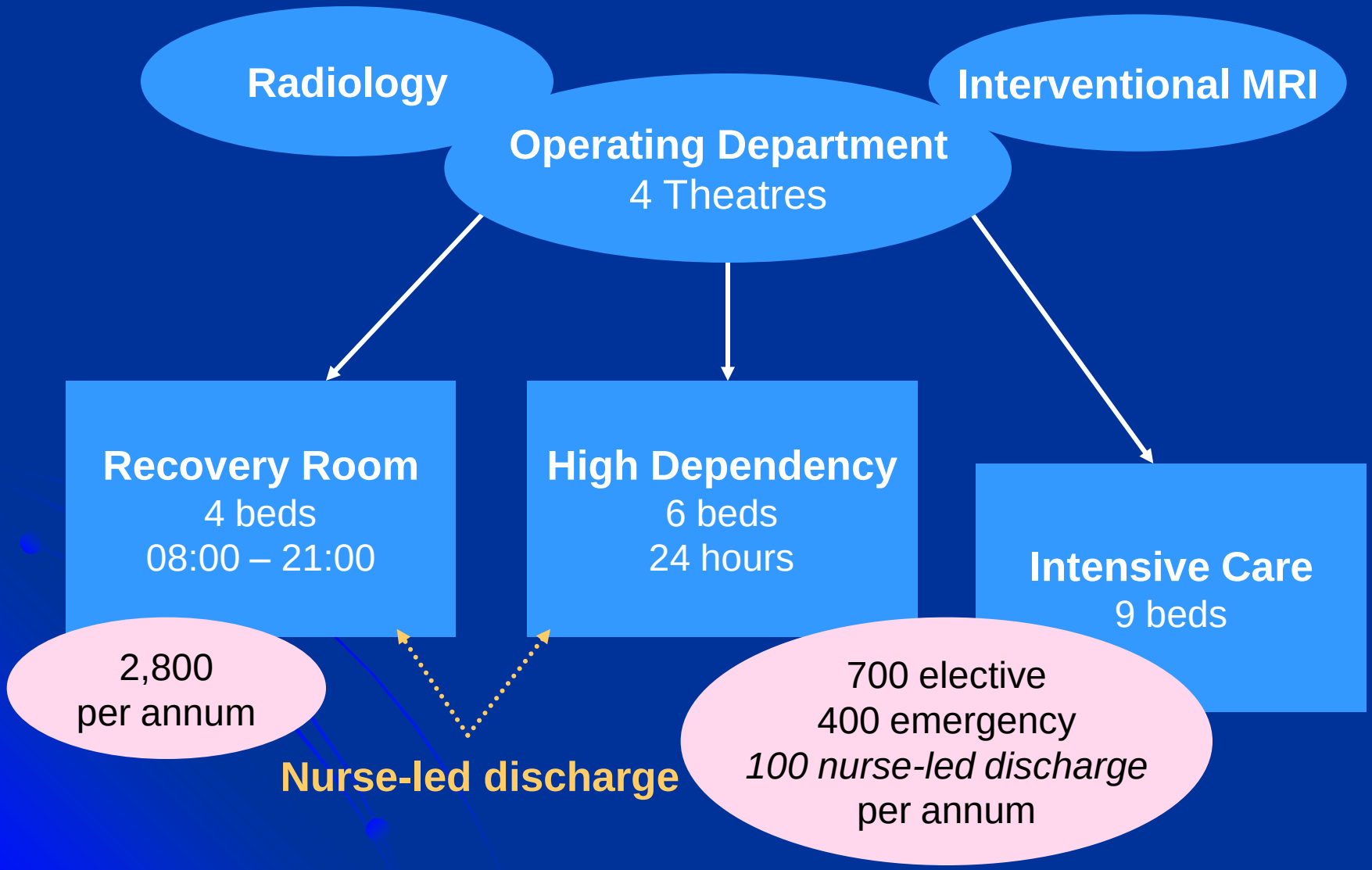
- In 2002 the Association of Anaesthetists of Great Britain and Ireland (AAGBI) published guidelines for immediate post-anaesthetic recovery *(currently under review)*
- Key standards from the guidelines
- Discuss the nurse-led service at The National Hospital – similar to recovery units across the UK

Key Standards from Guidelines



- All specialist recovery staff should be appropriately trained ideally to a nationally recognised standard
- The anaesthetist must formally hand over care of the patient to the recovery room nurse
- Patients must be observed on a one-to-one basis until they have regained airway control and cardiovascular stability and are able to communicate
- There must be agreed criteria for discharge of patients from the recovery room to the ward
- Close links with HDU and ICU

Post-operative care at The National Hospital



Discharge process same in Recovery and HDU

Recovery

- Dedicated area for post-anaesthetic care situated within Theatre suite
- Patients requiring up to 4 hours recovery
- Skilled staff familiar with high-turnover activity

High Dependency

- Integral part of intensive care
- Patients requiring > 4 hours post-operative recovery
  - Complex surgery
  - Significant co-morbidities
  - Post-operative cardiovascular support
  - Complex pain management issues
- Skilled staff familiar with post-operative / critically ill patients
- Conflicting demands of patients
  - Post-op versus HDU / post-ICU

POST- OPERATIVE DESTINATIONS AT NHNN

Where patient needs to be recovered

How long they should remain there before discharge back to ward

Post-operative Destination	Recovery Time *(hours)*	Discharge
Recovery		***Patient under care of surgical team***
CRANIAL SURGERY		***Standard recovery times are set as a general rule***
Craniotomy	**6**	***The Consultant Anaesthetist may reduce the recovery time for individual patients***
Acoustic Neuroma *(< 2cm)*	**6**	
Mini-craniotomy	**4**	
Carotid Endarterectomy *(Unilateral)*	**4**	
Temporal Lobectomy	**4**	
Deep Brain Stimulator *(DBS)*	**3**	
Burrhole Evacuation / Biopsy	**2**	
…ioplasty	**2**	
…rascular Decompression *(MVD)*	**2**	
…henoidal Hypophysectomy *(TSH)*	**1**	
…en Magnum Decompression *(FMD)*	**No minimum time**	
…ntriculo-peritoneal Shunt	**No minimum time**	
External Ventricular Drain *(EVD)*	**No minimum time**	
SPINAL SURGERY		***These patients can be discharged to the ward provided Discharge Criteria are***
Anterior Cervical Discectomy (ACD) / Decompression	**No minimum time**	
Posterior Cervical Decompression	**No minimum time**	
Lumbar Discectomy	**No minimum time**	
Microdiscectomy	**No minimum …**	
RADIOLOGICAL PROCEDURES		
CRANIAL		
Glue Embolisation of Arterio-venous Malformation *(AVM)*		
Coiling of Aneurysm *(unruptured / recoiling)*		
Embolisation Intracranial Tumour		
Diagnostic Angiogram		
SPINAL		
Arterio-venous Malformation *(AVM)*		
Dural Fistula		
OTHER		***…y ward may be given 15 minutes notice***
Nerve Stimulator *(occipital / vagal /sacral / spinal)*	**No minimum time**	
Ulnar Nerve Decompression	**No minimum time**	
Lumbar Drain	**No minimum time**	
Battery Change	**No minimum time**	
Thermo-coagulation	**No minimum time**	
Overnight Recovery (OR)		*Patient under care of surgical team*
Elective post-operative patients who have undergone procedures that require overnight *observation only* *(no intravenous infusions, e.g. morphine, inotrope)*	**Until 0600 – 0700 the following morning**	*Nurse-led discharge to ward by 0700 the following morning provided patient meets Discharge Criteria*
High Dependency Unit (HDU)		
CRANIAL SURGERY		
Craniotomy *(requiring invasive arterial pressure monitoring for 12-24 hours)*		
Subdural Grid Insertion		

Key standards from guidelines

Appropriately trained nursing staff

All specialist recovery staff should be appropriately trained ideally to a nationally recognised standard

Anaesthetist (and surgeon) happy to leave the patient in their care

Theatre Manager

↓

2 Senior Staff Nurses
3 Junior Staff Nurses

↓

Registered General Nurse
High dependency course
Surgical experience
Neurosurgical experience

↓

Recovery specific core skills

Airway management
Intermediate life support course
Intravenous administration of drugs
Management of pain and post-operative nausea and vomiting

Nursing competencies

Formal induction sessions

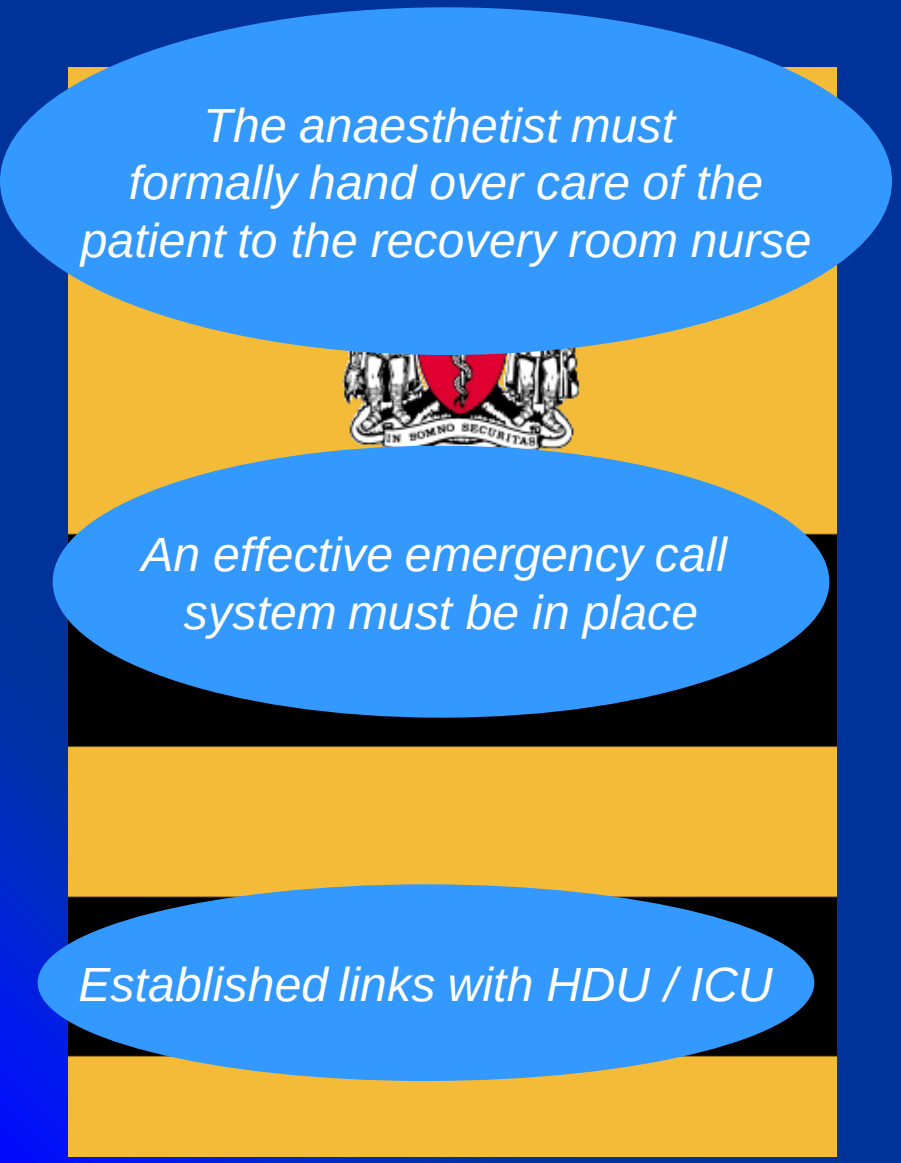
Work with anaesthetist in theatre

Required to observe 10 airways – including the 'difficult' airway

RECOVERY
4 WEEK OBJECTIVES FOR NURSING STAFF

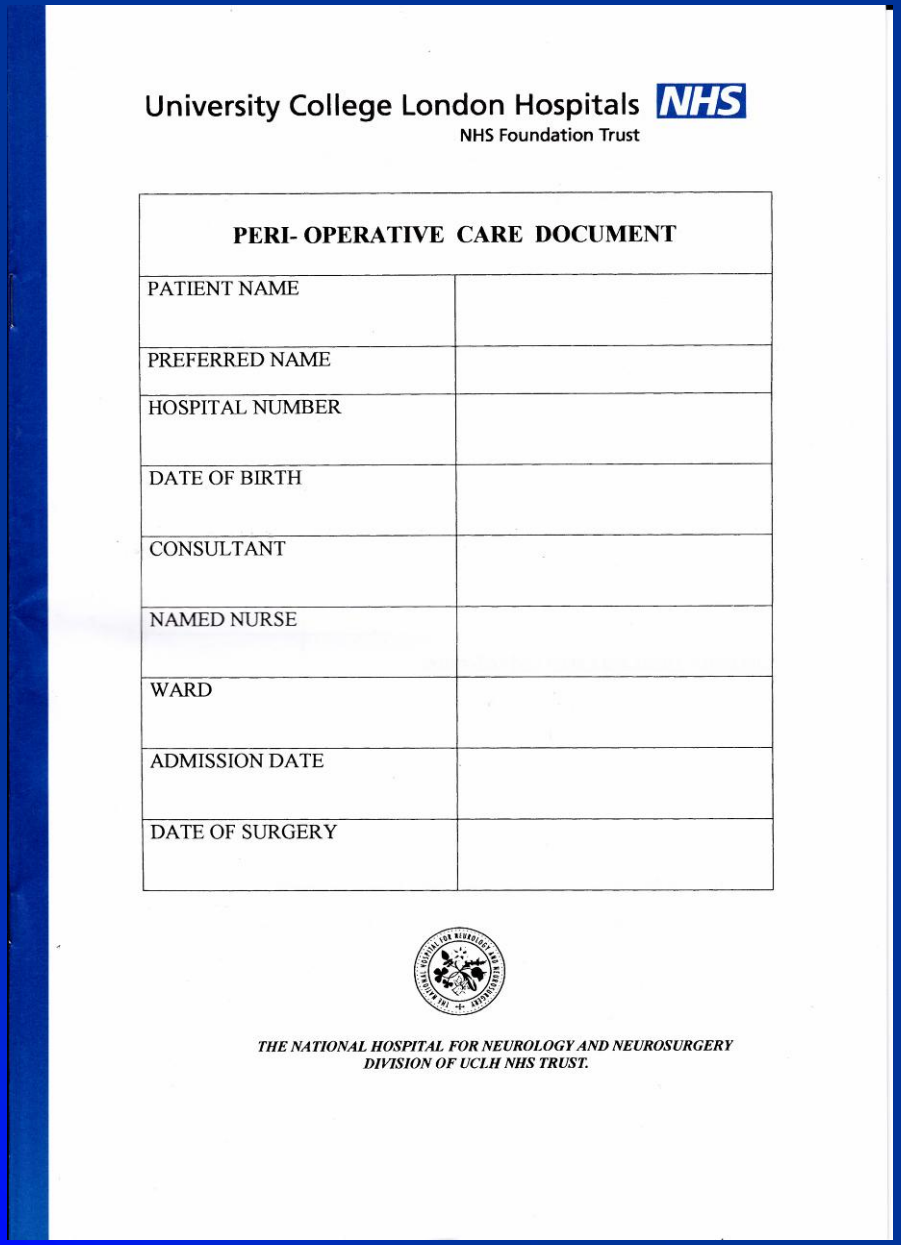
KNOWLEDGE *Demonstrates knowledge of :*	SKILLS *Able to :*
Signs of an obstructed airway	• Identify signs of the obstructed airway • Demonstrates how to perform jaw support
Identifies the patient who is not reversed from anaesthetic	• List the signs of patient not reversed • Demonstrates appropriate actions, (e.g. call help, airway management, waters circuit)
Neurological observations and their application following various surgical procedures	• Completes NHNN neurological observations booklet including practical competencies • Discusses which observations are required for patients who have undergone differing surgical procedures
Identify and manage a patient having a seizure	• Discusses reasons why a patient may experience a seizure post neurosurgery • List actions to be taken by the recovery nurse in the event of a seizure
Assessment of pain in the post-operative patient	• Demonstrates ability to use 4 point pain assessment tool in patients able to communicate • Discusses non-verbal/ physiological signs of pain
Strategies in the treatment of pain in neurosurgical recovery	• Demonstrates ability to administer and titrate IV morphine safely and appropriately for individuals • Discusses non-pharmacological measures to alleviate pain, (e.g. calming measures, positioning)
The main analgesic groups, Paracetamol Opiates NSAIDs	• Demonstrates basic understanding of the mode of action, potential side effects and drug interactions
Management of drains and surgical wounds immediately post-operatively	• Identifies differing types of drain seen in neurosurgical recovery (i.e gravity, suction, EVD, lumbar drain) • Can state what needs to be observed when checking wounds/drains • Discusses what action might be taken is

Key standards from guidelines
Handover of patients



- Phone call from theatre when patient ready for recovery
- Verbal and written handover
  - Anaesthetist – Anaesthetic chart
  - Scrub nurse – Peri-operative Document
  - Surgeon – Operation note
- Criteria for calling doctors
  - General
  - Patient specific
- Links with HDU / ICU
  - To facilitate change in destination
  - To ensure theatre throughput
    - 11 patients recovered in HDU
    - 7 HDU patients recovered initially in Recovery

Peri-operative Care Document



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PERI- OPERATIVE CARE DOCUMENT	
PATIENT NAME	
PREFERRED NAME	
HOSPITAL NUMBER	
DATE OF BIRTH	
CONSULTANT	
NAMED NURSE	
WARD	
ADMISSION DATE	
DATE OF SURGERY	

THE NATIONAL HOSPITAL FOR NEUROLOGY AND NEUROSURGERY
DIVISION OF UCLH NHS TRUST.

- ✓ Ward checklist
- ✓ Anaesthetic room care
- ✓ Operating room care
- ✓ Recovery room care

Key standards from guidelines
Nurse-patient ratio

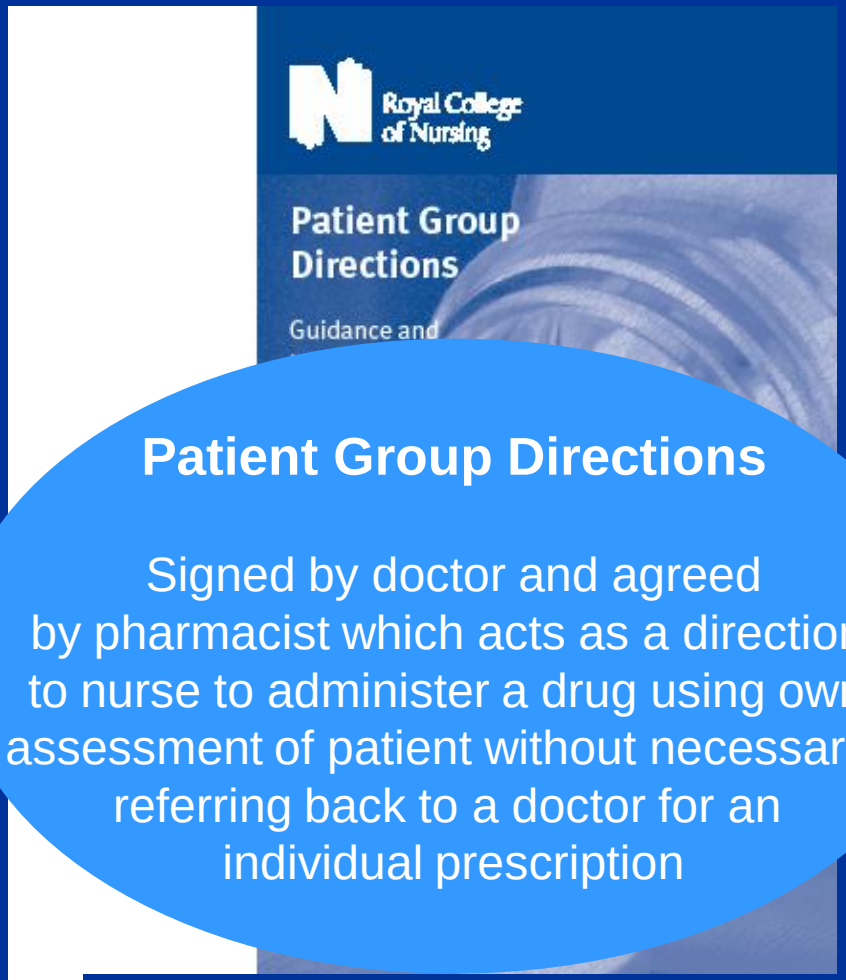
Patients must be observed on a one-to-one basis until they have regained airway control and cardiovascular stability and are able to communicate

- 1:1 initially
  - Recovery nurse takes over airway management from anaesthetist
- 1:2 until discharge to ward
- No fewer than 2 staff present when there is a patient in the recovery room who does not fulfil the criteria for discharge to the ward

Key standards from guidelines

Nurse 'prescribing' within set protocols

Administration of analgesics, anti-emetics and other drugs by all appropriate routes - guided by local protocols



Patient Group Directions

Signed by doctor and agreed by pharmacist which acts as a direction to nurse to administer a drug using own assessment of patient without necessarily referring back to a doctor for an individual prescription

Pain management
BP management

Pain management

1

Recovery / HDU / ITU only	Date	2mg
Morphine sulphate IV in **2mg** increments up to a total of **6mg** according to NHNN guidelines	Prescriber	2mg
		2mg

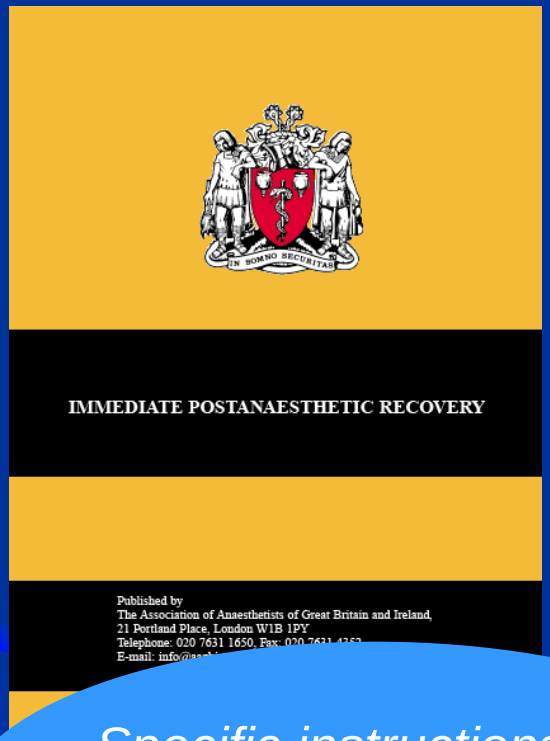
2

Recovery / HDU / ITU only	Date	2mg
Morphine sulphate IV in **2mg** increments up to a total of **6mg** according to NHNN guidelines	Prescriber	2mg
		2mg

Post-operative nausea and vomiting

Anti-emetics for the treatment of P.O.N.V. in adults	*Drug* **Cyclizine** *1st choice* *Dilute with normal saline or water for injection for IV administration as it can be painful* Give over 3-5 min	*Dose* **50mg**	*Date started*
		Frequency **8 hourly**	*Stop date*
1. Check patient is not allergic to any of the following drugs:		*Route* PO / IM / Slow IV	*Signature*
2. Give first choice anti-emetic			*Bleep*
3. If no response is seen in 30 minutes after dose, give next choice anti-emetic	*Drug* **Ondansetron** *2nd choice* *May be diluted with normal saline for IV administration* Give over 3-2 min	*Dose* 4-8mg	*Date started*
		Frequency 8 hourly	*Stop date*
4. If response is achieved, give the anti-emetic regularly for 24-48 hours		*Route* PO / IM / IV	*Signature*
			Bleep

Key standards from guidelines
Post-procedure protocols



- Post-care instructions for interventional radiology
- Post-operative instructions following spinal surgery

Specific instructions on post-operative care following complex procedures

Post-procedure protocols

Post care instructions for interventional neuroradiology

1. Puncture site

	R	L
• pressure only	☐	☐
• sealing device	☐	☐

2. Mobilisation

- keep supine – 0 to 30 ^{0} ___ **hours**

  can then mobilise gently provided there are no contraindications

3. Thromboprophylaxis / drug intervention

- aspirin once only ☐ 14 days ☐ Other ☐ ____
- clopidogrel once only ☐ 14 days ☐ Other ☐ ____

  (NB aspirin and clopidogrel together need PPI cover)
- Heparin - maintain APTT @ 2 x normal or fragmin 2500u s/c daily

  (see 'Guidelines for anaesthesia – Angiography Suite')
- other

4. Pathology

- cured ☐
- partially treated ☐
- other ☐

5. Blood pressure parameters

- _____ systolic

Review frequently in relation to neurological status, especially if change in BP or neurology

(If vasopressors required and no CVP consider metaraminol infusion - see 'Guidelines for anaesthesia – Angiography Suite')

6. Neurological observations

1. **GCS plus pupillary signs and limbs**
2. **Vision – can patient read**
3. **Other:**

7. Additional instructions

- If severe headache (Pain score 3 or > despite adequate analgesia) then immediate CT
- If new neurological deficit (new focal deficit, drop in GCS from baseline, new seizure, new pupillary signs or new cranial nerve signs) immediate CT.
- In either event, the clinical team must be contacted and informed of the char
  the clinical team must immediately review the CT.
- Between 08:30 and 17:30 Mon-Fri, also contact angiography suite x3444

Puncture site

Thromboprophylaxis

Pathology

BP parameters

Indications for urgent CT scan

Post operative instructions for spinal team

1. Sutures / Drains

R/O sutures …… days

redivac …… days ☐ suction ☐ gravity

CSF drain ……. days @ 15ml per hour

chest drain — remove when ≤ 50ml per 12hr

apical ☐ basal ☐

dural repair — lie flat for …. days

2. Stability

- Stable with no external brace
- Stable with external brace — soft collar ☐
  - Miami J ☐
  - custom made ☐
  - halo brace ☐
- Log roll with — 3 nurses ☐
  - 5 nurses ☐
  - 5 nurses + head hold ☐
- Stable with no external brace but log roll with 3 nurses for comfort for 24-48 hr ☐

3. Mobilisation

- NO restrictions ☐
- Mobilise after 24 -48 hr as pain allows ☐
- Only mobilise with brace / collar ☐
- Mobilise when lumbar drain removed ☐
- Sit up to 45° ☐ Sit up to 90° ☐

4. DVT prophylaxis

- Flowtron boots (mechanical compression) ☐
- Compression stockings ☐
- s/c low molecular weight heparin — 6hr post op ☐
  - next morning ☐
  - other (specify) ☐

5. Other

Spinal x-ray ☐ CT ☐ MRI ☐

NSAIDs: none (fusion case) ☐

48 hours only ☐

unrestricted (if no medical contraindications) ☐

Dexamethasone: none ☐ 'tail off' ☐ review 48hr ☐

Sutures and drains

Stability of spine

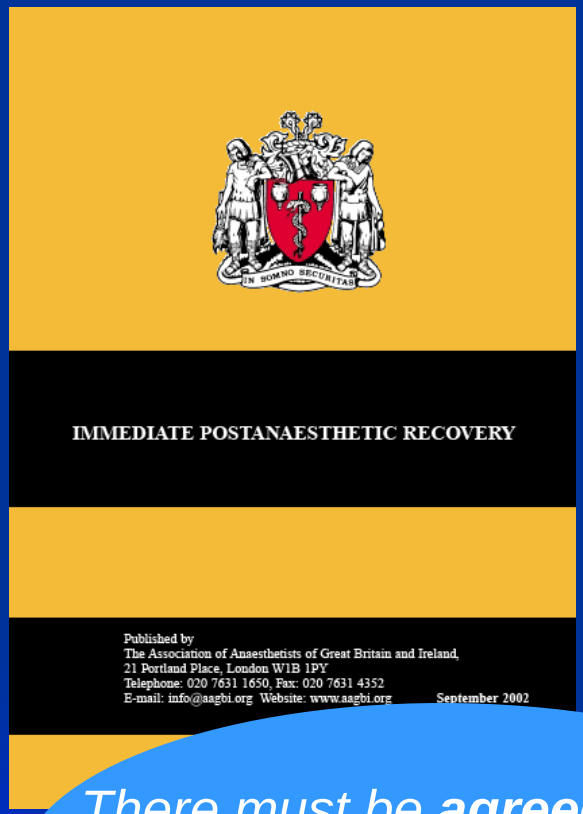
Mobilisation

DVT prophylaxis

Investigations and drugs

Key standards from guidelines

Discharge criteria



*There must be **agreed criteria for discharge** of patients from the recovery room to the ward*

NHNN RECOVERY ROOM GUIDELINES

Operation / Procedure	Recovery Time (hours)	Discharge Criteria
CRANIAL SURGERY		
Craniotomy	6	***Recovery times are set as a general rule***
Acoustic Neuroma *(< 2cm)*	6	
Mini-craniotomy	4	***The Consultant Anaesthetist may reduce the recovery time for individual patients***
Carotid Endarterectomy *(Unilateral)*		
Temporal Lobectomy	4	***These patients can be discharged to the ward provided the Recovery Discharge Criteria are met***
Deep Brain Stimulator (DBS)	3	
Burrhole Evacuation / Biopsy	2	**Discharge according to Recovery Discharge Guidelines in Peri-operative Care Document**
Cranioplasty	2	
Microvascular Decompression (MVD)	2	
Transphenoidal Hypophysectomy (TSH)	1	Patent **airway**
Foramen Magnum Decompression (FMD)	No minimum time	
Ventriculo-peritoneal Shunt	No minimum time	Normal **breath** sounds SpO_2 > 95% ≤3 litres oxygen therapy
External Ventricular Drain (EVD)	No minimum time	
SPINAL SURGERY		**Pulse and BP** within normal parameters for patient **Temperature** ≥ 36ºC
Anterior Cervical Discectomy (ACD) **/ Decompression**	No minimum time	
Posterior Cervical Decompression	No minimum time	**Neurology** same or better than pre-operatively or with **expected** changes as assessed by surgeon
Lumbar Discectomy	No minimum time	
Microdiscectomy	No minimum time	
RADIOLOGICAL PROCEDURES		For **cranial** procedures •GCS •Pupils •Limb assessments
CRANIAL		
Glue Embolisation Arterio-venous Malformation (AVM)	3	
Coiling of Aneurysm *(unruptured / recoiling)*	2	For **spinal** procedures •Limb assessments
Embolisation Intracranial Tumour	2	
Diagnostic Angiogram		**Pain** addressed prior to discharge
SPINAL		
Arterio-venous Malformation (AVM)	1	Symptoms of **nausea** and **vomiting** addressed prior to discharge
Dural Fistula	1	
OTHER		No excessive **wound** drainage
Nerve Stimulator *(occipital / vagal / sacral / spinal)*	No minimum time	
Ulnar Nerve Decompression	No minimum time	*Wards will be contacted **30 minutes** prior to discharge for most patients*
Lumbar Drain	No minimum time	
Battery Change	No minimum time	*For minor procedures requiring <1 hour in recovery the ward may be given **15 minutes** notice*
Thermo-coagulation	No minimum time	

NHNN Recovery July 2008

Discharge Criteria

*Standard recovery times are set as a **general rule***

Consultant Anaesthetist may reduce the recovery time for individual patients

*Patients can be discharged to the ward by the recovery nurse provided the **Recovery Discharge Criteria** are met*

Discharge according to Recovery Discharge Guidelines in Peri-operative Care Document

Patent **airway**

Normal **breath** sounds
SpO_2 > 95%
≤3l oxygen therapy

Pulse and BP within normal parameters for patient
Temperature ≥ 36°C

Neurology same or better than pre-operatively or with **expected** changes as assessed by surgeon

For **cranial** procedures
- *GCS*
- *Pupils*
- *Limb assessments*

For **spinal** procedures
- *Limb assessments*

Pain addressed prior to discharge

Symptoms of **nausea** and **vomiting** addressed prior to discharge

No excessive **wound** drainage

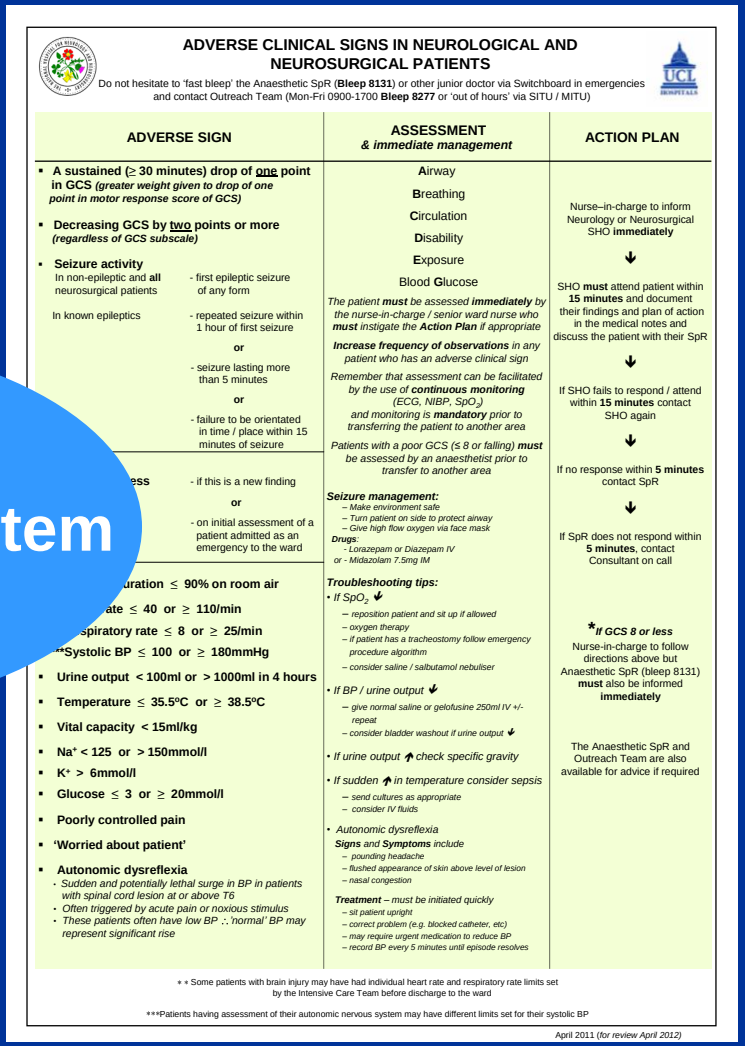
*Wards contacted **30 minutes** prior to discharge*

Other key factors to support nurse-led service

Skilled staff on wards

Early warning system

Critical Care Outreach Service



ADVERSE CLINICAL SIGNS IN NEUROLOGICAL AND NEUROSURGICAL PATIENTS

Do not hesitate to 'fast bleep' the Anaesthetic SpR (**Bleep 8131**) or other junior doctor via Switchboard in emergencies and contact Outreach Team (Mon-Fri 0900-1700 **Bleep 8277** or 'out of hours' via SITU / MITU)

ADVERSE SIGN	ASSESSMENT *& immediate management*	ACTION PLAN
▪ **A sustained (≥ 30 minutes) drop of one point in GCS** ***(greater weight given to drop of one point in motor response score of GCS)***	**A**irway **B**reathing **C**irculation **D**isability **E**xposure Blood **G**lucose	Nurse–in-charge to inform Neurology or Neurosurgical SHO **immediately**
▪ **Decreasing GCS by two points or more** ***(regardless of GCS subscale)***	*The patient **must** be assessed **immediately** by the nurse-in-charge / senior ward nurse who **must** instigate the **Action Plan** if appropriate*	↓
▪ **Seizure activity** In non-epileptic and **all** neurosurgical patients – first epileptic seizure of any form In known epileptics – repeated seizure within 1 hour of first seizure **or** – seizure lasting more than 5 minutes **or** – failure to be orientated in time / place within 15 minutes of seizure	***Increase frequency of observations** in any patient who has an adverse clinical sign* *Remember that assessment can be facilitated by the use of **continuous monitoring** (ECG, NIBP, SpO_2) and monitoring is **mandatory** prior to transferring the patient to another area* *Patients with a poor GCS (≤ 8 or falling) **must** be assessed by an anaesthetist prior to transfer to another area*	SHO **must** attend patient within **15 minutes** and document their findings and plan of action in the medical notes and discuss the patient with their SpR ↓ If SHO fails to respond / attend within **15 minutes** contact SHO again ↓ If no response within **5 minutes** contact SpR ↓ If SpR does not respond within **5 minutes**, contact Consultant on call
…ess – if this is a new finding **or** – on initial assessment of a patient admitted as an emergency to the ward	***Seizure management:*** *– Make environment safe* *– Turn patient on side to protect airway* *– Give high flow oxygen via face mask* ***Drugs**:* *- Lorazepam or Diazepam IV* *or - Midazolam 7.5mg IM*	
…uration ≤ 90% on room air **…ate ≤ 40 or ≥ 110/min** **…spiratory rate ≤ 8 or ≥ 25/min** ****Systolic BP ≤ 100 or ≥ 180mmHg**	***Troubleshooting tips:*** • *If SpO_2 ↓* *– reposition patient and sit up if allowed* *– oxygen therapy* *– if patient has a tracheostomy follow emergency procedure algorithm* *– consider saline / salbutamol nebuliser*	***If GCS 8 or less*** Nurse-in-charge to follow directions above but Anaesthetic SpR (bleep 8131) **must** also be informed **immediately**
▪ **Urine output < 100ml or > 1000ml in 4 hours**	• *If BP / urine output ↓* *– give normal saline or gelofusine 250ml IV +/- repeat* *– consider bladder washout if urine output ↓*	
▪ **Temperature ≤ 35.5ºC or ≥ 38.5ºC**	• *If urine output ↑ check specific gravity*	
▪ **Vital capacity < 15ml/kg**	• *If sudden ↑ in temperature consider sepsis* *– send cultures as appropriate* *– consider IV fluids*	The Anaesthetic SpR and Outreach Team are also available for advice if required
▪ **Na^+ < 125 or > 150mmol/l**	• *Autonomic dysreflexia* ***Signs** and **Symptoms** include* *– pounding headache* *– flushed appearance of skin above level of lesion* *– nasal congestion* ***Treatment** – must be initiated quickly* *– sit patient upright* *– correct problem (e.g. blocked catheter, etc)* *– may require urgent medication to reduce BP* *– record BP every 5 minutes until episode resolves*	
▪ **K^+ > 6mmol/l**		
▪ **Glucose ≤ 3 or ≥ 20mmol/l**		
▪ **Poorly controlled pain**		
▪ **'Worried about patient'**		
▪ **Autonomic dysreflexia** • *Sudden and potentially lethal surge in BP in patients with spinal cord lesion at or above T6* • *Often triggered by acute pain or noxious stimulus* • *These patients often have low BP ∴ 'normal' BP may represent significant rise*		

* * Some patients with brain injury may have had individual heart rate and respiratory rate limits set by the Intensive Care Team before discharge to the ward

***Patients having assessment of their autonomic nervous system may have different limits set for their systolic BP

April 2011 (for review April 2012)

Recovery related adverse incidents

- No deaths
- No surgical or anaesthetic complications which were not managed in competent and timely manner
  - 2 patients $\Rightarrow$ CT scan $\Rightarrow$ ICU
  - 7 patients $\Rightarrow$ HDU for pain management
- No complications on the wards related to inappropriate discharge from recovery

In summary

- Nurse-led post-operative recovery is safe
  - Highly skilled nursing staff
  - Competent in managing post-operative patients
  - Develop intuitive grasp of when the patient ‘is not quite right’
- Improves theatre throughput
- Better utilisation of staff and skills
- Patient experience

Thank you