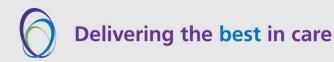
# Documentation of neurological determination of death

Dr Nilesh Parekh
Consultant and RCLOD
QEHB





# DNDD

## **Preparation**

#### Evidence for Irreversible Brain Damage of known Aetiology

Case records, past medical history including possibly contacting the GP, relevant imaging.

## 2. Exclusion of Reversible Causes of Coma and Apnoea

Standard ICU cardio-respiratory monitoring (to ensure haemodynamic stability), medication chart and history, blood and urine drug assay results (where relevant), drug antagonists (e.g. flumazenil, naloxone), peripheral nerve stimulator, recent serum glucose and biochemistry, thermometer, patient warming device.

#### 3. Tests for Absence of Brain-Stem Function

## Brain-stem reflexes

Bright light source; small gauze sterile swabs, otoscope with disposable ear pieces, 50 ml luer lock syringe and disposable quill, ice-cold water; a spatula, Yankauer sucker or laryngoscope, endotracheal suction catheters.

#### Apnoea test

Haemodynamic monitoring (continuous ECG, invasive arterial pressure), arterial blood gas analysis including blood gas syringes x4, pulse oximetry and end-tidal CO<sub>2</sub> monitoring, means of delivering oxygen to the trachea by bulk flow (e.g. Mapleson B circuit which allows CPAP or endotracheal suction catheter and oxygen tubing).



## Tests for Absence of Brain-Stem Function

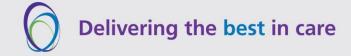
## Preparation for the Apnoea Test

- Oxygenation and cardiovascular stability should be maintained through each apnoea test. Preoxygenate FiO<sub>2</sub> 1.0.
- Allow PaCO<sub>2</sub> to rise to at least 6.0 kPa by reducing the minute ventilation prior to commencing
  the apnoea test. End tidal carbon dioxide can be used to guide the starting of each apnoea test
  but should not replace the pre and post arterial PaCO<sub>2</sub>.
- Cardiac pulsation may be sufficient to trigger supportive breaths if the patient remains
  connected to the mechanical ventilator and on a spontaneous breathing mode. Performing the
  apnoea test whilst remaining on mechanical ventilation is not recommended.

#### Guidance

Recommended methods:

- CPAP circuit (eg Mapleson B), especially if oxygenation is a problem, or
- Disconnect the patient from the ventilator and administer oxygen via a catheter in the trachea at a rate of >6L/minute.





	1 <sup>st</sup> Test		2 <sup>nd</sup> Test		
Arterial Blood Gas PRE apnoea test: Confirm PaCO <sub>2</sub> is at least 6.0 kPa but not substantially	1st Test Starting p	aCO <sub>2</sub> :	2 <sup>nd</sup> Test Starting paCO <sub>2</sub> :		
greater. In patients with chronic CO <sub>2</sub> retention, or those who have received intravenous bicarbonate, it recommended that PaCO <sub>2</sub> is allowed to rise to above 6.5 kPa.	Should be	kPa e ≥6.0 kPa	kPa Should be ≥6.0 kPa		
PRE Arterial Blood Gas pH/[H <sup>+</sup> ]: Confirm pH < 7.4 or [H <sup>+</sup> ] >40 nmoles/L.	[H+]=	d be < 7.4 40nmoles/L	pH= Should be < 7.4 [H*]= Should be >40nmoles/L		
Start time: Time when apnoea test was commenced.	hr : min (24 hour clock)		hr : min (24 hour clock)		
Arterial Blood Gas POST apnoea test:	1# Test Stopping paCO₂:		2 <sup>nd</sup> Test Stopping paCO <sub>2</sub> :		
Ensure the PaCO <sub>2</sub> has increased by greater than 0.5 kPa.	kPa Should have increased by > 0.5			kPa d have l by > 0.5	
Stop time: Time when apnoea test was ceased.	hr : min (24 hour clock) Perform lung recruitment		hr : min (24 hour clock) Perform lung recruitment		
Was there any spontaneous respiration during a minimum of 5 (five) minutes continuous	Dr One	Dr Two	Dr One	Dr Two	
observation following disconnection from the ventilator? (To diagnose death using neurological criteria, ALL answers should be NO)	Yes / No	Yes / No	Yes / No	Yes / No	



# FICM vs AoMRC

#### Form for the Diagnosis of Death using Neurological Criteria {full guidance version}

This form is consistent with and should be used in conjunction with, the AoMRC (2008) A Gode of Practice for the Diagnosis and Confirmation of Death and has been endorsed for use by the following institutions: Faculty of Intensive Care Medicine, Intensive Care Society and the National Organ Donation Committee.

HOSPITAL ADDRESSOGRAPH or

Sumame First Name Date of Birth NHS Number

#### Objective of Care

 To diagnose and confirm the death of a mechanically ventilated, severely brain injured patient in coma, using neurological criteria.

#### Academy of the Medical Royal Colleges Definition of Human Death (2008).3

"Death entails the irreversible loss of those essential characteristics which are necessary to the existence of a living human person and, thus, the definition of death should be regarded as the irreversible loss of the capacity for consciousness, combined with irreversible loss of the capacity to breath. The irreversible cessation of brain-stem function whether induced by intra-cranial events or the result of extra-cranial phenomena, such as hypoxia, will produce this clinical state and therefore irreversible cessation of the integrative function of the brain-stem equates with the death of the individual and allows the medical practitioner to diagnose death."

#### Context

- National professional guidance advocates the confirmation of death by neurological criteria wherever this seems a likely diagnosis and regardless of the likelihood of organ donation.<sup>2</sup>
- UK General Medical Council (GMC) guidance on end of life care (2010) states that national procedures for identifying potential organ donors should be followed and, in appropriate cases, the specialist nurse for organ donation (SN-OD) should be notified.<sup>3</sup> NICE guidance recommends that the specialist nurse for organ donation (SN-OD) should be notified at the point when the clinical team declare the intention to perform brain-stem death texts.<sup>4</sup>

Date and time of referral to SN-OD:

- Whilst most patients will already be in an intensive Care Unit (ICU) when the diagnosis is suspected, some patients may be in other areas, e.g. the Emergency Department. On such occasions it is legitimate, if considered necessary, to transfer a patient to the ICU for the diagnosis to be made.
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#### APPENDIX 1

PROCEDURE FOR THE DIAGNOSIS AND CONFIRMATION OF CESSATION OF BRAIN-STEM FUNCTION BY NEUROLOGICAL TESTING OF BRAIN-STEM REFLEXES

Diagnosis is to be made by two doctors who have been registered for more than the years and are competent in the procedure. At least one should be a consultant. Testing should be undertaken by the doctors logisther and must always be performed compilately and successfully on two occasions in total.

Patient Name: Unit No:

Pre-conditions

Are you satisfied that the patient suffers from a condition that has led to irreversible brain damage?

Specify the condition:

le DrB:

Time of onset of unresponsive coma:

le Dr

Are you satisfied that potentially reversible causes for the patient's condition have been adequately excluded, in particular:

	DRA:	DR B:
DEPRESSANT DRUGS		
NEUROMUSCULAR BLOCKING DRUGS		
НУРОТНЕЯМА		
METABOLIC OR ENDOCRINE DISTURBANCES		

TESTS FOR ABSENCE OF BRAIN-STEM FUNCTION	1º SET OF TESTS	2= SET OF TESTS	OF TESTS	OF TESTS
DOTHE PUPILS REACTTO LIGHT?				
ARETHERE CORNEAL REFLEXES?				
ISTHERE EYE MOVEMENT ON GALORICTESTING?				
ARETHERE MOTOR RESPONSES INTHE CRANIAL NERVE DISTRIBUTION IN RESPONSE TO STIMULATION OF FACE, LIMBS OR TRUNK?				
ISTHE CAG REFLEX PRESENT?				



# ICS & Other

			Name						
			Name Address						
Appendix 1			Address						
Proforms for documentation of brain	n stem tests								
Diagnosis is to be made by two doc		dered for more than five years	Date of birth		_				
and are competent in the procedure may carry out the tests separately o performed.	<ul> <li>At least one should be</li> </ul>	a consultant. The two doctors	Condition which led to irremediable	brain dama	ge:				
Name:	Unit No:		Onset of apnoeic coma;	Date		Time:			
Pre-Conditions Are you satisfied that the patient su damage? Specify the condition:	ffers from a condition the	t has led to irremediable brain	PRECONDITIONS; is apmoric of	Ass	essment A	wing?	Assessii		
Dr A:	Dr Bt.		Depressant drugs	Yes	No		Yes	No	
Time of onset of unresponsive com-	er.		Neuromuscular blocking drugs						
Dr A:	Dr Bt.		Hypothermia						
Are you setisfied that potentially rev	versible causes for the pa	dent's condition have been	Metabolic causes		-		H	-	
adequately excluded, in particular:			Endocrine disturbance				H		
	DrA	Dr B	Elidocalile disturbance	_			_		
Depressent drugs Neuromuscular blocking drugs			CLINICAL TESTS OF BRAIN	STEM E	UNCTION:				
Hypothermia			CENTICAL TESTS OF BRAIN		essment A		Assessm		
Metabolic or endocrine disturbences				Yes			Yes	No No	
Tests for absence of brain stem	D- 4		Is there a motor response to painful						
function	Dr A	DrB	stimulus in cranial nerve distribution	? 🗆					
	1st 2nd Testing Testing	1st 2nd Testing Testing	Do the pupils react to light?						
Do the pupils react to light?	Testing Testing	Testing Testing	Are corneal reflexes present?						
Are there corneal reflexes?		+	Do the eyes move on caloric testing?						
is there eye movement on caloric testing?			Is there a gag reflex?						
Are there motor responses in the cranial nerve distribution in			Is there a cough reflex?						
response to stimulation of face, limbs or trunk?		1 1 1	Were there respiratory movements		_				
Is there a gag reflex?			during apnoea testing?						
is there a cough reflex? Have the recommendations			PaCO <sub>2</sub> pre and post apnoea test;	Pre .	Post			ast 🗌	
concerning testing for apnoes been followed?			pH pre and post apnoea test;	Pre 🗆	Post 🗆	Pro	e 🗌 P	cest 🗌	
Were there any respiratory		<del>                                     </del>				1			7
moments seen?			Date and time of tests: Assessmen	nt A.		Assess-ment	В		
	35								
	33			Assessor(	s) A	A	ssessor(s)	) B	
			Name(s)						
			Grade				_		
			Signature						
			Confirmation of brain death						
Date and time of first testing:			Do the above tests confirm brain deal	th?	Yes 🗆	No	- 10		
Date and time of second testing:			The state of the s						
Dr A Signature:	Dr B Signature:		Date of death	The contract of the contract o	e of death				
Status	Status:								
			Name	Stgr	ature		G	irade	



# Confusion

Tests for Absence of Brain-Stem Function					
	1st Test Dr One Examining	1# Test Dr Two Observing	2 <sup>nd</sup> Test Dr One Observing	2 <sup>nd</sup> Test <b>Dr Two</b> Examining	
Do the pupils react to light?	Yes / No	Yes / No	Yes / No	Yes / No	
Is there any eyelid movement when each cornea is touched in turn?	Yes / No	Yes / No	Yes / No	Yes / No	
Is there any eye movement during or following caloric testing in each ear?	Yes / No	Yes / No	Yes / No	Yes / No	
Is there any motor response when supraorbital pressure is applied?	Yes / No	Yes / No	Yes / No	Yes / No	
Is the gag reflex present?	Yes / No	Yes / No	Yes / No	Yes / No	
Is the cough reflex present?	Yes / No	Yes / No	Yes / No Yes / N		
Arterial Blood Gas pre apnoea test check: (Starting paCO <sub>2</sub> ≥ 6.0 kPa and starting pH <7.4 or [H <sup>+</sup> ] >40 nmoles/L)	1st Test Starting paCO <sub>2</sub> : Starting pH/[H <sup>+</sup> ]:		2 <sup>nd</sup> Test Starting paCO <sub>2</sub> : Starting pH/[H <sup>+</sup> ]:		
Is there any spontaneous respiration within 5 (five) minutes following disconnection from the ventilator?	Yes / No	Yes / No	Yes / No	Yes / No	
Arterial Blood Gas Result post apnoea test: (paCO <sub>2</sub> rise should be > 0.5 kPa)	1st Test Final paCO <sub>2</sub> : Perform lung recruitment		2 <sup>nd</sup> Test Final paCO <sub>2</sub> : <i>Perform lung</i>	z recruitment	

TESTS FOR ABSENCE OF BRAIN-STEM FUNCTION	1 <sup>ST</sup> SET OF TESTS
DOTHE PUPILS REACTTO LIGHT?	NO
ARETHERE CORNEAL REFLEXES?	NO
ISTHERE EYE MOVEMENT ON CALORICTESTING?	NO
ARETHERE MOTOR RESPONSES IN THE CRANIAL NERVE DISTRIBUTION IN RESPONSE TO STIMULATION OF FACE, LIMBS ORTRUNK?	NO
ISTHE GAG REFLEX PRESENT?	NO
ISTHERE A COUGH REFLEX?	NO
HAVE THE RECOMMENDATIONS CONCERNING TESTING FOR APNOEA BEEN FOLLOWED?	YES
WERETHERE ANY RESPIRATORY MOVEMENTS SEEN?	NO



