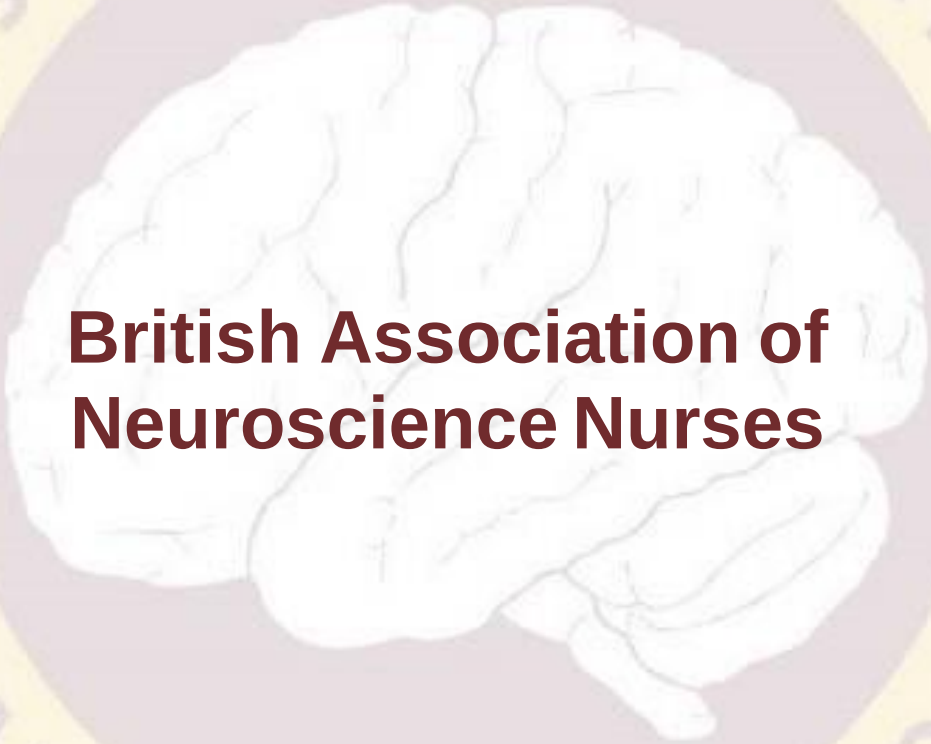
Benchmark No. 13

Intracranial Pressure Monitoring (ICP)

(2nd Edition)



British Association of Neuroscience Nurses

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History

The Neuroscience Nursing Benchmarking Group (NNBG) was established in the 1990`s as a result of increasing concerns over inconsistencies in practices as part of a subsidiary of BANN. The group aims to improve on the quality of care by comparing and sharing practice with each other and set explicit standards for comparison of current practice against the ideal standard. The group is committed to searching for the best evidence related to specific areas of neuroscience practice. Membership of the group consists of representatives from neuroscience units within the UK and Ireland, together with educational colleagues from both the NHS/HSC and Higher Educational Institutes. The group is further subdivided into regions and this benchmark was developed by the Northeast group of the NNBG in 2007.

In 2016, the NNBG consolidated back into BANN and further information about NNBG can be found on the BANN website www.BANN.org.uk .

BANN would like to acknowledge the leadership and significant contribution made by the NNBG, and all its contributors, to neuroscience nursing over the years.

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Key Points

- Written guidance is available on the management of Intracranial monitoring.
- All documentation has been reviewed in the last two years.
- The nurse is assessed as competent and knowledgeable in the monitoring of ICP.
- An evidence-based protocol/care plan is available relating to the individual patient needs.
- A structured training and education programme is available for staff on ICP monitoring for level 0-3 patients (as appropriate).
- Accurate documentation includes trace, event monitoring, waveform and interventions and activities that may influence the patient's ICP.
- Information in the appropriate format is available to patients and carers/families.

FACTOR 1 – Documentation

STATEMENT OF BEST PRACTICE		EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
1.0	A detailed care plan is available which is specific to ICP monitoring, including: a) The documentation of the manufacturer/site of the monitoring device b) The reference number of the ICP device is documented. c) The landmark for the Foramen of Munro is documented (*zero pressure point is established prior to levelling or zeroing the pressure transducer)* d) ICP & Cerebral Perfusion Pressure (CPP) parameters are documented by medical staff. e) Any alterations to clinical neurology associated with fluctuations in ICP are documented (e.g., ↓ level of consciousness, alterations in sensory and motor function, changing size of pupils and reaction) f) Troubleshooting in relation to potential problems and complications are documented (e.g., CSF leak, poor trace, wound site) g) The escalation process for initiating acute interventions for the management of elevated ICP.	Munakomi & Das 2024			
1.1	Neurological observations are documented and titrated according to the clinical needs of the patient.	NICE Guideline [NG32], 2023 NEWS2, 2017			
1.2	**Observations** a) Physiological signs are continuously monitored - pulse, respiratory rate, blood pressure, temperature, Mean Arterial Pressure (MAP), CO_2 monitoring and pain. b) Sustained increases in ICP (usually >20mmHG), and decreased CPP (below prescribed parameters), are documented and escalated to medical staff c) CPP and waveform changes in relation to the effects of therapeutic interventions, noxious stimuli and patient transfers are documented.	Munakomi & Das 2024 NEWS2, 2017 Kirkness *et* al. 2000 Lima *et al* 2019			

STATEMENT OF BEST PRACTICE		EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
1.3	**Level 0-1 patients (Diagnostic/therapeutic ICP testing)** a) Staff are aware of the individual calibration requirements for ICP monitoring equipment. b) Recalibration times are documented c) ICP recordings are accurately recorded on a designated chart (paper/electronic) d) CPP and waveform changes in relation to the effects of therapeutic interventions, noxious stimuli and patient activities are documented.	Kirkness *et al* 2000			

FACTOR 2 – Protocol

STATEMENT OF BEST PRACTICE		EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
2.0	Local guidelines/policy, based on the best available evidence, is available for the management of patients undergoing ICP monitoring including information related to: - a) The type of bolt and catheter used b) Fluid filled systems (refer to CSF benchmark) c) Event monitoring and recording d) Knowledge of monitoring equipment in local use e) Technical support related to the monitoring system f) Recalibration procedure g) Trouble shooting process h) Care and maintenance of the catheter i) Removal of the catheter				
2.1	Assessment of competence is made and recorded in staff educational documentation				
2.2	Infection control concerns are addressed, and necessary precautions adhered to (i.e. elective admissions with known previous infections e.g. MRSA positive)	Loveday *et al.* 2014			
2.3	Strict aseptic technique is maintained with any interventions or manipulations of the ICP catheter	Munakomi & Das 2024			
2.4	The wound/insertion site is frequently observed for signs of CSF leakage or bleeding (any leakage is immediately escalated to medical staff)	Munakomi & Das 2024			
2.5	Head hygiene a) The dressing over the insertion site, if used, is transparent to enable free observation of the wound without the need to disturb the catheter b) The patient's hair is washed prior to insertion of the catheter and long hair is tied up c) Hair hygiene is maintained whilst ICP bolt is insitu				

FACTOR 3 – Education

STATEMENT OF BEST PRACTICE		EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
3.0	**Level 0-1 patients** Training is available for the management of patients undergoing ICP monitoring as an elective procedure, including: a) Pathophysiology of raised ICP b) Rationale for monitoring the ICP c) Potential risks and complications i.e. infection, haemorrhage, drift rate d) 'Red flag' signs for new staff e) Significance of abnormal readings f) 'Mapping' of patient activity in line with monitoring g) Importance of obtaining a good quality trace h) Wound and insertion site care i) Trouble shooting (e.g. loss of reading/trace)	BTF, 2016			
3.1	**Level 1-3 patients** Training is available for the management of patients requiring ICP monitoring as an emergency procedure, including: a) The effects of nursing interventions on ICP e.g., hypercapnia, head position, tracheal suctioning, extreme hip flexion, cervical collar, ↑ intra-abdominal pressure, temp control, seizures, sedation and analgesia. b) Effects on CPP of positioning arterial transducer at tragus versus level with the heart c) The effects of osmotherapy, sedation and decompressive surgery on ICP d) Significance of ICP waveform tracings and changes in relation to different physiologic conditions (identify dampened waveform) e) Potential artefacts that distort ICP waveforms & how to correct them f) Potential risks/complications i.e. infection, haemorrhage, drift rate, CSF leak g) Infusion studies to monitor ventricular compliance - event monitoring should be documented both pre, during and post recording h) Intracranial haemodynamics in head injuries – knowledge of nursing interventions to optimise ICP & CPP.	Kirkman & Smith, 2014 Liu *et al.* 2020 Thomas et al 2015 Lalou *et al.* 2020 Olson *et al.* 2013 Thomas *et al.* 2015 Munakomi & Das 2024			

FACTOR 4 – Patient Information

	STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
4.0	People with raised ICP have consented to the ICP monitoring and are aware of the rationale for the procedure	NHS, 2019			
4.1	Information is available including an explanation of: a) Rationale for treatment and expected duration b) Importance of maintaining head of bed position to maintain accuracy and safety of treatment c) Explanation of the need for recording events in relation to the ICP trace d) Explanation of the effects of the environment, pain, care interventions, and external stimuli on the person's ICP. (involve family in planning to control stimuli to minimise elevation of ICP readings) e) Explanation of possible need for replacement of monitoring device if monitoring or drainage needs to be continued f) Explanation of the interpretation of the readings obtained and implications of the findings g) Explanation of possible need for insertion of indwelling shunt if long-term CSF drainage is advised h) Advice related to wound management – signs of infection, removal of sutures, hair washing and escalation and contact details in the event of complications following discharge	Kirkman & Smith, 2014 Lima *et al.* 2019 Thomas *et al.* 2015 NICE [NG32], 2023 Munakomi & Das 2024			
4.2	Verbal information given is clearly documented in the patient's records				

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