

Development of the Anaesthetic Approach to **Neuro-surgical Emergencies (AANE) Simulation** Course Following a Local Trainee Survey.

NHS University Hospitals Coventry and Warwickshire



Warwickshire Simulation

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### Introduction

Throughout our careers we encounter unfamiliar situations. Primarily occurring during training and out of hours, and whilst being the on call specialist. Depending on the centre, there may be a different level of complexity surrounding situations you face, where you are deemed immediately responsible, despite possibly being ill-experienced.

### Results

Of those surveyed; 63% were not confident about managing a NS emergency and 88% had concerns about managing these emergencies in and out of the theatre area. Reasons for this included comparatively less experience and lack of familiarity with the specialty and equipment, complexity of cases and interaction with neurosurgeons. All participants reported they would find further training beneficial.

We realised that at University Hospitals Coventry & Warwickshire (UHCW) that the senior registrar tier for out of hours were not all familiar with neurosurgery as a specialty because of the limited availability and timing of training opportunities available in our school of anaesthesia.

This was in part due to re-deployment during the Covid-19 pandemic, which has had a national impact on all trainees. It was also due to limited placements available at neuro-surgical (NS) centres at various stages of the training.

As a result of this we formed a multi-disciplinary simulation course, which focuses on key topics with fundamental learning points, and non-technical skills (NTS) including effective communication and understanding of behaviours.

Feedback from this course has been unilaterally positive, and attendees feel better prepared and knowledgeable to deal with acute neurosurgical emergencies. Candidates also found the sessions helped in developing awareness of human factors and NTS as a whole.





### Conclusion

Our survey demonstrated that there was a space to be bridged in preparing trainees for dealing with neurosurgical emergencies. This was positively and effectively done by formation of our AANE course. A multi-disciplinary approach in its delivery has been crucial, and has helped to build foundations for effective team working.

### Methodology

We conducted an anonymous online survey of our registrars to assess a baseline level of confidence and concerns that they might have about being on call whilst managing a NS emergency.

We are now looking to further develop the AANE course to include increasingly complex and varied scenarios both within and outside of the theatre environment, and also combine these with short lectures.



We were able to ascertain the training stage of the registrars and the if they had completed a neuro-anaesthesia module at an intermediate, higher or advanced curriculum level. We asked by a measurement scale about confidence level and also enquired about concerns with managing NS emergencies out of hours both in and outside of the theatre complex.

We then asked if trainees would find further training beneficial and they wanted any particular aspects of training to be included.

### Acknowledgements

The team at the Warwickshire Simulation Centre, based at UHCW. Icons courtesy of www.freepik.com

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## **Out of Hours Provision of Mechanical Thrombectomy in the UK**

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NHS St George's University Hospitals



### Introduction

Mechanical thrombectomy (MT) is now considered the gold standard treatment for acute ischaemic stroke, significantly improving outcome in suitable patients. In 2017, NHS England stated that every neuroscience centre in the UK should be progressing towards providing a 24h service. Service provision has expanded rapidly since then and many centres will have dealt with this challenge differently. We conducted a survey to establish the



### **Chart 2: Reason for Choice of Anaesthetic**

current provision of MT services across the UK, how this has been staffed and the impact on existing services

### Methodology

Questions were composed using Survey Galaxy and distributed by NACCS to their linkmen, aiming for one response per UK neuroscience centre. The out of hours (OOH) period was defined as 1800h - 0800h.

Results

16 centres responded correlating to a 53% response rate.

Out of Hours mechanical thrombectomy is provided in 10 centres (63%) and a 24h service provided in 31%. The remaining centres all have plans to progress to 24h provision, but the timescale for this is unclear in most. Two centres plan to expand to a 24h service

Joint decision between anaesthetist/radiologist Radiologist preference

The majority of centres (88%) use a general anaesthetic technique; this is primarily driven by joint agreement between anaesthetist/radiologist (62%) or radiologist preference (38%).

81% have a protocol or guideline in place for anaesthesia for MT – the most frequently mentioned recommendations are on: BP parameters/intervention triggers (69%); patient monitoring (63%); post-procedure destination (63%); and anaesthetic technique (50%).



**Chart 3: Impact of OOT MT on Existing Services** 

within the next year.

In centres with a 24h service, approximately 50-60% of cases occur OOH.

For the majority of centres (55%), the routine post-procedure destination is a Hyperacute Stroke Unit (HASU) capable of providing 'level 1' care. In other centres, patients are looked after either in critical care units (21%) or in standard medical wards (11%).



In addition to MT, centres cover the following services OOH: neurosurgical theatres (100%), other theatres (81%), neuro-critical care (31%), other critical care (25%). The majority of centres reported an impact on these other services due to provision of OOH MT (Table 1).

To accommodate the extra out of hours workload: 58% have absorbed this into their existing on-call rota; 25% have created a new on-call tier.

### Conclusion

The provision of MT in the UK has expanded rapidly since its commission.

GA has become the predominant anaesthetic technique in most centres, although there is no clear evidence to support either GA or LA, both are safe and effective when there is little delay and parameters are controlled. Practice varies internationally.[1]

Care is provided by neuroanaesthetists (53%), or a mix of general/neuroanaesthetists (47%). Senior trainees/fellows are used in addition to consultants in 44%.

For daytime MT service, 75% of units have specific sessional time job planned for this.

Out of hours, 67% of centres have a dedicated MT team; 33% of the cases are done by the theatre emergency team.

There is a staffed recovery room in 75% of units.

There is still some way to go in providing a robust out of hours service, with many units lacking dedicated MT staff and the majority reporting a detrimental impact on competing emergency and elective surgical services.

### References

- JE Dinsmore, A Tan. Anaesthesia for mechanical thrombectomy: a narrative review. Anaesthesia 2022, 77 (S1)
- 2. Zhang L, Dinsmore J, Khan U et al. General Anaesthesai vs Conscious Sedation for Mechanical Thrombectomy in Acute Anterior Circulation Ischaemic Stroke Vasc Interv Neurol 2022;2:e000130

### **Questions?**

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Send me your question via direct message on Whova: **Yvonne Bramma** 



## **Paediatric Posterior Fossa Surgery: A National Survey of Current Practice**

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### Introduction

Around 400 children a year in the UK are diagnosed with a brain tumour, over half of which originate in the posterior fossa. A number of these children will present for craniotomy - with procedures ranging from tissue biopsy to full surgical resection of the lesion.

There are no published national guidelines for the anaesthetic





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management of paediatric posterior fossa craniotomy. Clinical practice is therefore based on level 3 and 4 evidence, institutional history, consensus opinion and individual preference.

We conducted a survey of Neuroanaesthesia and Critical Care Society (NACCS) and Paediatric Neuroanaesthesia Network (PNAN) members to explore current UK practice.

### Methodology

An online survey was sent to all NACCS and PNAN members. Data was collected on anaesthetic technique, monitoring, anaesthetist, analgesia, antiemesis, lines, fluids, postoperative destination and complications.

Results

### **Postop Destination** 16% 23% Recovery then ward Recovery then HDU/ITU Directly to HDU/ITU 61%

Cases were performed by a paediatric anaesthetist in 46.1% cases, a neuroanaesthetist with special interest in paediatrics in 23% and dual trained anaesthetists in 28.2%. Central lines were used frequently/always in 37.8%. Hartmanns or plasmalyte were used preferentially in 92.3% cases.

Complications from monitoring and positioning included pressure sores (mild), line displacement, corneal abrasion, facial and tongue swelling. The importance of meticulous attention when positioning, especially in those under 10kg and those undergoing intraoperative MRI was highlighted.

### 39 responses were received.







### Conclusions

This survey demonstrates the variations in anaesthetic care between centres and individuals for children undergoing posterior fossa surgery. This may represent the diversity of procedures, institutional and personal experience and preference within this sub specialist area.

Surveys such as this and evolution of societies such as the Paediatric Neuroanaesthesia Network give those of us working in this area the opportunity to start a discussion and learn from each other's experience.

It also reiterated how logistical pressures (staffing levels and timing of surgery) can affect the clinical choices surrounding the care of these patients.







**Postop Antiemetics** ⊐regular □prn 29 16 10 Ondansetroi Cvclizine

### Acknowledgements

### Many thanks to NACCS for distributing the survey to its members.

**Questions?** 

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Send me your question via direct message on Whova: Rebecca Campbell



### **Respiratory Care Bundle**

### **Does it Reduce the Need or Duration of Mechanical Ventilation Required in those admitted with High Spinal Injury?**

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Institute of Neurosciences and Spinal Unit, Queen Elizabeth University Hospital Glasgow



### Introduction

The respiratory care bundle was introduced in Queen Elizabeth National Spinal Injuries Unit to reduce the need for invasive ventilation in those with respiratory failure. This is a local policy, used regardless of level or mechanism of injury, whether invasively ventilated or not.

This quality improvement project aims to determine if the care bundle has reduced 1. The need for intubation and invasive ventilation

2. The duration of mechanical ventilation when instigated

### Results

### Pre-bundle

165 non-ventilated patients were admitted9 required intubationOn average this happened on day 6.5

There was an overall 5.1% chance of getting intubated (2.8% days 0-7, 2.2% after day 7) 4 (44%) patients had a tracheostomy placed

### Post bundle

383 non-ventilated patients were admitted14 required intubationOn average this occurred day 5.5

### <u>Care bundle</u>

1. Early discussion with the patient about potential for respiratory dysfunction, chest infection and need for intubation

2. Regular bronchodilators (Salbutamol and Atrovent 4 x daily regardless of whether wheeze is present).

### 3. Carbocisteine TDS

4. Cough assist or 'BIRD' to be set up and used 4 times per day after nebulised bronchodilators.

5. High Flow Nasal Oxygen when not on non-invasive ventilation or cough assist. Use lowest Fi02 to maintain. oxygen saturations at 95%. Flow rate to be 60L to achieve positive end expiratory pressure of 5.

6. Non-invasive Ventilation (NIV). 4x 1hr periods per day delivered via facemask after nebulisers (approx 08:00, 13:00, 18:00 and 22:00). Pressure support to be set at 10, PEEP at 5, background rate of 4 (the minimum). This therapy may be used more often if the patient requires it.

7. Chest physiotherapy (morning and afternoon).

8. Incentive Spirometry device use encouraged (when appropriate)

### Methodology

### Caldicott guardian approval granted

There was a 3.6% chance of needing intubated (2.6% days 0-7, 0.76% chance after day 7) 9 (64%) had a tracheostomy placed

### Duration of ventilation

The average duration of ventilation was 11 days ranging from 1 to 45 days pre-bundle and between 1 and 61 for patients pre and post bundle respectively



### Out of Hours Intubations

Out of hours intubations occurred in 1 in 7 and 5 in 13 patients before and after the bundle was introduced respectively.

### Conclusion

### The bundle looks to have reduced non-elective intubations, especially after day 7 of admission,

- Inclusion criteria those admitted with a spinal injury affecting T1 and above
  Exclusion Criteria None
- Electronic and paper noted were used for data collection
- Two groups of patients were compared
  - 1. Pre bundle admitted from January 2015 up to and including those admitted December 2016
  - 2. Post-bundle those admitted from January 2017 to September 2021

and has saved some who would only have needed ETT (not subsequent tracheostomy) from getting invasive ventilation at all. It has therefore reduced the incidence of complications related to invasive ventilation especially in this group.

Data available was too limited to draw any substantial conclusions on duration of ventilation. However, the pre-bundle group seems to include a group of patients who were ventilated for a short period of time. This group is not seen in the post-bundle group, supporting the above concept.

It doesn't look to have had an effect on reducing out of hours intubations; this may be better approached from an escalation point of view or may be an inevitable occurrence in which case better planning and education including simulation with potential staff involved may be of benefit.

It was noted during data collection that a large proportion of useful data was extracted from allied health professional's records of care further emphasising their vital role in patient care within this setting.

Scope for further practice involves

- Care bundle effect on antibiotic usage
- Potential for use in other settings i.e acute trauma wards
- Use of bundle from day 1 of injury
- Rationalise the bundle based on improving patient compliance
- Look at education on airway support in ward staff

### Acknowledgements

Many thanks must be extended to the Allied health Professionals involved in taking up this care bundle for the benefit of our patients. Kind thanks to the Consultants who supported this project. Last but most thanks to L Wright for her consistent kindness with ethics, data collection, and logistics which made this project a pleasure.

**Questions?** 

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Development of a transcranial MR guided focused ultrasound thalamotomy service for treating essential tremor

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> > Ninewells Hospital, Dundee. NHS Tayside

### Introduction

Transcranial MR guided focused ultrasound thalamotomy (MRgFUS) is a new, non-invasive therapy for medication-refractory essential tremor and is recommended by NHS England<sup>1</sup>.

We have developed a new service with anaesthetic

### Results

S naccs

All 9 patients experienced an immediate marked benefit from unilateral MRgFUS (figure 2). One patient returned for further treatment of a proximal tremor.

Our three month follow-up data (n=7) demonstrates sustained tremor resolution (7/7). One patient

### support, offering the first MRgFUS in Scotland.

### Methodology

Multiple bursts of MR guided high energy US (11–45s) were applied via an external US array targeting the motor nucleus in the thalamus.

The procedure required a stereotactic frame (figure 1) to be applied to the patient's head. The patient was alert between sonications to allow examination and target adjustment. Procedures lasted up to three hours.

Skull density ratio (SDR) was measured, with low ratios being associated with higher intraprocedural energy

demonstrated side effects (dysguesia & balance disturbance).

Anaesthetic support was essential for three patients. Titration of analgesia/sedation was required in two (acute headache during sonication). These patients had low SDRs: 0.42 (median 0.47, range 0.41-0.59), which are associated with higher energy requirements<sup>2</sup>

Morphine and midazolam were given to the first, which unfortunately caused some masking of their tremor. Alfentanil was given to the second with good effect. A third patient with poorly controlled diabetes required close blood glucose monitoring.



### requirements.

All patients received paracetamol and ibuprofen and had IV access. Monitoring was applied to those receiving IV medication. Effect was measured by specialist assessment including pre and post procedure spiral drawings. Requirements for analgesia and sedation were recorded.



Figure 1: Stereotactic frame – attached with pins to patient's head. A rubber band seal is also applied to the head to allow circulation of cold water throughout the procedure.



Figure 2: Spiral drawings from a patient undergoing MRgFUS. Tracing a spiral forms part of the assessment and demonstrate the immediate benefit patients experience.

### Conclusion

This life changing and non-invasive treatment causes an immediate and sustained reduction in tremor, returning hand function to near normal.

Airway management including bag-mask ventilation would be very challenging once the frame had been applied.

Anaesthetic risks mainly revolve around difficulty in accessing the airway, due to the stereotactic frame, and the remote location in the MRI suite. Provision of support can be targeted to patients at higher risk of needing it, particularly relating to pain management.

### References

1. Transcranial magnetic resonance guided focused ultrasound thalamotomy for treatment of medicationrefractory essential tremor, NHS England 2021

2. Boutet A, Gwun D, Gramer R et al. The relevance of skull density ratio in selecting candidates for transcranial MR-guided focused ultrasound. J Neurosurg 2020 132:1785–1791

### **Questions?**

Send me your question via direct message on Whova: **Ben Ulyatt** 

## Understanding anaesthetic practice and decision making in the care of patients with chronic subdural haematoma: a survey of anaesthetists and neurosurgeons



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### Introduction

- Chronic subdural haematoma (CSDH) is a common neurosurgical pathology the occurrence of which is expected to rise significantly in the coming decades.
- Surgery can be performed successfully under either local (LA) or general anaesthesia (GA) however, definitive evidence as to the optimal method is lacking.
- We aimed to define current practice and understand anaesthetic and surgical decision making relating to choice of anaesthetic technique

### Methodology

### **Factors influencing choice of anaesthetic**

• Our respondents indicated the following factors influenced their choice of local vs general.

Favouring General: Airway Concerns Agitated Behaviour Favouring Local: Frailty Comorbidity

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We performed a structured literature search with reference to search terms: 'anaesthesia' and 'chronic subdural haematoma' (and equivalent variants/MeSH terms) of Medline, EMBASE & Cochrane libraries)

Information used to populate survey (anaesthetic agents, factors affecting) choice of anaesthetic etc).



**Distribution via NACCS** 

via SNBS Distribution

UK Anaesthetists and Neurosurgeons surveyed with online platform

### Results

We received 215 responses (n = 125 for anaesthesia, n = 89 for surgery).

### **Future research**

### Figure 2: Factors affecting choice of anaesthetic

Respondents were asked to rate whether each factor listed on y-axis favoured choice of local or general. Where: 1 indicates the factor strongly favours general, 3 indicates equipoise and 5 indicates strongly favouring local.

### Perceived effect of anaesthetic choice on outcomes

• Our respondents indicated that they believed some outcomes could be better with local



59% of surgeons (n = 45)

Agreed the question of anaesthesia modality in CSDH surgery could benefit from further investigation with a randomised controlled trial.

### **Standard Practice**

(n = 72)

Local was standard practice for: 6% of anaesthetists (n = 8) 11% of surgeons (n = 10)



74% of anaesthetists (n = 92)



81% of surgeons YHY.

General was standard practice for:

### Anaesthetists Surgeons

including medical complications and length of stay.



Figure 3: Perceived effect of anaesthetic choice on outcomes

Respondents were asked to indicate how they felt anaesthetic technique affected each outcome on y-axis. Where: 1 is much better with general, 3 indicates equipoise and 5 is much better with local

### Conclusion



### Figure 1: Estimated proportion of cases performed under local Respondents were asked to estimate the percentage of cases they do under local (x-axis). Anaesthesia n = 124, surgery n = 89.

### **Confidence** performing cases under local



81% of surgeons

(n = 64)

Felt 'probably' or definitely confident in providing care under **local** 

GA was the most frequently employed anaesthetic technique in this UK survey.

Our respondents felt that LA may result in improved outcomes in some areas.

Neurosurgeons and anaesthetists report a high degree of confidence in treating patients under LA.

A majority of respondents indicated that a definitive RCT was required to inform best-practice.

### Acknowledgements

The authors would like to thank NACCS and SBNS for distributing the survey as well as all the clinicians who gave up their time to participate in it.

Questions

Send me your question via direct message on Whova: George Gathercole



Post-Traumatic Delirium and Agitation Syndrome in Severe Traumatic Brain Injury: A retrospective analysis from the Neuroscience Intensive Care Unit of a Major Trauma Centre

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\*Neuroscience ICU, Oxford University Hospitals Foundation Trust, UK

### Introduction

Delirium has a reported incidence between 20% to 80% in Neurosciences Intensive Care Unit (NICU) [1] and is associated to poor outcomes. It is often underrecognised and under-treated due to symptoms overlap with the manifestation of the brain injury and need for longer periods of sedation. The aim of this service evaluation is to assess how many TBI patients develop delirium in NICU.

### Results

All patients assessed with the CAM-ICU (16%) had delirium. An additional 65% had documented symptoms of delirium (agitation, hallucination, etc.) but no formal diagnosis was made. We found no statistical differences in the two groups. However, on-scene Glasgow Coma Scale (GCS) (median 7 [IQR 5.5-10] vs 10 [IQR 7-13]), first GCS motor score (median 4.5 [IQR 2.5-5] vs 5 [IQR 5-6]) were on average lower in the delirious patients. Alpha2agonist (clonidine) and antipsychotics were more commonly used in the delirium (clonidine: 45% vs 20%; antipsychotics: 30% vs 0%).

### Methodology

We retrospectively screened 37 NICU admission for two time periods: from between December 2019 (n=21) and from June 2020 (n=16). We collected data about patients' demographics, past medical history, systemic severity, severity of trauma, and signs of infection. Clinical notes were reviewed to flag patients with signs

### Conclusion

Delirium was significantly underdiagnosed. A mismatch between the absence of formal diagnosis of delirium and the presence of clinical signs of the disease was the most frequent pattern observed. Optimising patient screening and considering delirium in NICU patients as a diagnostic entity might improve early detection and prompt treatment. A larger cohort is necessary to analyse associations with risk factors in this population..

of Delirium or a positive Confusion Assessment Method – ICU (CAM-ICU).

### Acknowledgements





(Boxplot: interquartile range. Red dot: median value)

[1] Zaal, I. J. & Slooter, A. J. C. Delirium in critically ill patients: epidemiology, pathophysiology, diagnosis and management. Drugs 72, 1457–1471 (2012).

Questions?

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## Improving patient safety during position changes under general anaesthesia -"CHOPP (Change Of Patient Position) check" - a new patient safety and educational tool



Dr. Kareem Hussein, Dr. Irene Leonard and Dr. Michael Moore

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### Introduction

Optimal patient positioning to facilitate surgical access frequently requires a change of position from the usual starting supine position which might pose many potential risks to patients. The aim of our study was to reduce risk and improve patient safety during changes of position under anaesthesia and provide a practical tool to

### Results

80% of the respondents found the checklist is userfriendly and recommended its implementation. The checklist identified issues during patient repositioning in more than 70% of the time. The most common issues identified was traction/disconnection of monitoring cables during patients positioning. The surgical staff and anaesthetics nurses showed support for the introduction of this safety pause.



Anaesthesia trainees to ensure safe and confident clinical practice when managing position changes of patients under anaesthesia.

### Methodology

Pre- and Post- change of patient position (CHOPP) safety checklists were devised and implemented in Neurosurgical operating theatres. Staff education delivered to an initial pilot group. Laminated checklists disseminated and displayed in prominent locations at key sites. Practice runs and simulation training completed prior to roll-out. A survey was completed after using the checklist to assess its usefulness and risks which have been prevented by using the checklist

### Conclusion

This checklist can provide a practical tool to guide staff and enhance their ability to reduce risk and improve patient safety during periods of increased risk associated with position changes under anaesthesia.

### **Questions**?

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CHOPP - CHange	of Patient Position under anaesthesia	Recorded Hospital CHOPP - CHan	ge of Patient Position under anaesthesia
Haemodynamics	ECG - BP - SpO <sub>2</sub> Monitored? Readings within safe limits?	Haemodynamics	ECG - BP - SpO <sub>2</sub> Monitored? Readings within safe limits?
Ventilation	EtCO <sub>2</sub> - P <sub>aw</sub> - VT <sub>e</sub> Monitored? Readings within safe limits?	Ventilation	EtCO <sub>2</sub> - P <sub>aw</sub> - VT <sub>e</sub> Monitored? Readings within safe limits?
Airway	Airway device (ETT / LMA) Adequately secured? Designated Anaesthetist to ensure airway remains secure during move?	Airway	Airway device (ETT / LMA): Patent? Position at lips? Ventilator tubing safely positioned? Air entry: Bilateral and equal?
Equipment	Lines (IV, Arterial) - monitoring cables ventilator tubing - urinary catheter:		Eyes: Closed and protected? Free from compression?

### Free from traction during move?

Patient

Equipment

(pauded if appropriate) Positioned safely? Neck: No hyper-flexion -extension -rotation? Abdomen: Free / not compressed? (if prone) Neurovascular points: Protected / padded? Nose, ears, shoulders, elbows, genitals, fibulae, heels: - Free of pressure / passive stretch?

### IV fluids / Infusions:

Flowing freely? Injection port accessible? Pumps functioning? connected to power? Monitoring cables / ventilator tubing: Safely positioned? Warming device: Connected? Setting appropriate? Thromboprophylaxis: TEDs on? Pneumatic compression required?

Urinary catheter bag: Visible? Operating table control: Accessible?



## The impact of COVID-19 on neurosurgical theatre activity in the National Neurosurgical Centre of Ireland



**Beaumont Hospital** 

Dr Kareem Hussein, Dr. Aoife Geoghegan, Dr. Mohamed Hassan and Dr. Michael Moore Anaesthesia Department, Beaumont Hospital Dublin, Ireland

The median number of the monthly neurosurgical procedures Introduction performed decreased from 177 in 2019 to 176 in 2020 and 169 in The global health-care activity including neurosurgical 2021. services has been significantly impacted by COVID-19 The lowest number of monthly caseloads was recorded in April pandemic with some centres reported a reduction of more 2020 during the first wave of the pandemic. The first quarter of than 50% of its activity during the first wave of the 2021 recorded the lowest number of quarterly surgical pandemic. procedures over the entire 3 years period contributing to just 19.4% of 2021 caseload. Subgroup analysis showed a significant Methodology reduction in trans-sphenoidal pituitary surgeries post-pandemic conducted a retrospective, single institution, We by 36% and 44% in 2020 and 2021 respectively (Fig 2).

observational cohort study. We reviewed the neurosurgical theatre activity from 1st January 2019 to 31st December 2021 and examined the total number of operations performed daily throughout the study period. The extracted data included date, type of surgical procedure, age and gender of the patient and case scheduling (elective or emergency). Subgroup analysis was performed on the type of neurosurgical procedure completed i.e. Craniotomy for space occupying lesions (SOL), brain biopsy, intracranial vascular procedures, spinal surgery, CSF diversion surgery, trans-sphenoidal pituitary resections, and vagal nerve stimulator implantation surgery.

Fig 2: Subspeciality analysis of the surgical procedures



### Results

In total, 6139 neurosurgical procedures were recorded throughout the study period. 2144 neurosurgical procedures were recorded in 2019, 2052 in 2020 and 1943 in 2021 corresponding to a reduction in theatre activity by 4.3% and 9.4% in 2020 and 2021 respectively (Fig 1). The downward trend in the total number of neurosurgical operations performed following the onset of the pandemic included both elective and emergency procedures.

Fig 1: Monthly theatre activity



Despite the exceptional stress imposed on our institution by COVID 19, the neurosurgical service managed to maintain comparable activity levels to 2019. The 2021 activity levels were more significantly impacted with 9.4% reduction when compared with pre-pandemic figures in 2019. This correlates with the peak COVID-19 demand for ICU beds which occurred during first quarter of 2021. Institutions needs to develop a robust emergency plan to reduce the impact of any subsequent pandemics on healthcare delivery.

**Questions?** 

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## **Prolonged volatile anaesthesia drives deleterious** changes to astrocyte gene-expression

**Z Jiwaji,** J McQueen, P Baxter, S Chandran, GE Hardingham UK Dementia Research Institute, University of Edinburgh



THE UNIVERSITY of EDINBURGH Edinburgh Neuroscience



### Introduction

Astrocytes are the most abundant cell-type<sup>1</sup> with multiple brain for brain homeostasis and roles neuroprotection.



### A mouse model of inhalational anaesthesia Mice were exposed to 3 h of 1.2% isoflurane anaesthesia. Pulse, RR, SpO2, core-body temp was measured. Active warming provided and fluids administered. After anaesthesia, mice culled and cortices dissected.

How can we separate astrocyte gene-expression from those in other cells? Translating ribosome affinity purification (TRAP) used to separate astrocyte transcripts. Cell-type specific tagged ribosomes allowed us to pull down astrocyte ribosomes along with translating mRNA, prior to sequencing.

Methodology



Increased neuronal firing

In prior work<sup>2</sup>, we determined that **actively firing** neurons signal to astrocytes to control their gene-expression and boost astrocyte metabolic support.

Anaesthetic agents are potent suppressors of neuronal firing. However, the molecular consequences of anaesthesia on astrocytes, and whether it influences the above homeostatic pathways, was unknown.

### **RESEARCH QUESTIONS**

1. How does volatile anaesthesia change astrocyte gene-expression? 2. Does volatile anaesthesia influence known neuronal activity-mediated pathways important for neuroprotection and metabolic homeostasis?



Unbiased and highly sensitive **next-generation** sequencing approach used to measure the expression level of every single gene from astrocytes in anaesthetised vs non-anaesthetised mice



### Conclusion

Results

Anaesthesia has wide-ranging consequences on astrocyte gene expression

• We present here the first description of the molecular consequences of prolonged



Volcano plot showing changes in expression in astrocyte gene anaesthetised vs non-anaesthetised coloured animals. Each spot represents an astrocyte gene that is significantly changed (p\_adj< 0.05). Red = upregulated > 1.5 fold. **Blue = downregulated > 1.5 fold** 

**volatile anaesthesia on astrocytes** – an important yet under studied cell-type in the brain.

- **Anaesthesia drives widespread transcriptomic changes**, disrupts metabolic pathways and induces pro-death signatures - changes that could contribute towards brain vulnerability in high-risk patients.
- Our ongoing work now seeks to determine whether restoring these astrocyte pathways (via electrical stimulation or pharmacological treatments) can protect vulnerable brains during anaesthesia.

### **Study Limitations**

- How relevant is our mouse model to humans? Conflicting evidence from clinical studies regarding the harm caused by anaesthesia and further clinical trials now needed.
- Gene-expression changes may not translate to functional outcomes.
- Direct vs indirect affects of anaesthesia? But both would be important for brain

## Anaesthesia alters genes found to be regulated by neuronal activity and

### important for neuroprotection and metabolism

Genes changed by anaesthesia overlap with those altered by neuronal activity

Anaesthesia enhances pro-death genes normally suppressed by neuronal firing

**Pro-death genes** 

Key glycolytic-pathway genes

Anaesthesia suppresses metabolism

genes normally enhanced by

neuronal firing

**Anaesthesia altered n = 5100** 







### protection.

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**Questions?** 

Email: <u>zoeb.jiwaji@ed.ac.uk</u> or via direct message on Whova: **Zoeb Jiwaji** 

This work will also be presented on Tuesday morning as part of the free-paper

presentation, and I look forward to answering questions then.







## Preparing for 24 hour stroke thrombectomy cover: An intra-op audit

Simon Mackie<sup>1</sup>, Ali Ford<sup>2</sup>

Northern Care Alliance

1 Speciality Trainee North West Deanery, Salford Royal Hospital

2. Consultant Anaesthetist, Salford Royal Hospital

### Introduction

Salford Royal is a busy neurosciences centre shortly moving to a 24 hour stroke thrombectomy service. To help prepare we wanted to seek out areas for improvement by auditing our intra-op



Cases noted with high technical difficulty affecting timing

management against new consensus guidelines

### Parameters analysed:

GCS, Timings, anaesthetic type, all MAP values

Methodology



GA was more commonly used than sedation (88%) Mode GCS was 15 for both GA and sedation

Volatile used 100% of the time with a 75/25%



All intra-op MAP values

split between Sevoflurane/Desflurane Mean time until extubation identical between volatiles



Conclusion





A mode GCS of 15 for all GA cases suggests this is not the factor being used to decide anaesthetic type. With identical times until extubation it is possible there is no advantage with desflurane. A very low proportion of GA cases used invasive monitoring with a wide variation in MAP values. At departmental discussion it was felt time pressure was the limiting factor in placing arterial lines. As a result of this audit the radiologists are now carrying out these procedures using larger femoral sheaths allowing for arterial monitoring to be quickly and directly attached.





**Questions?** 

Tweet your questions to me! Start your tweet with: @DrS\_Mackie #NACCS2022 Poster



## Improving the post operative experience for adult patients undergoing Foramen Magnum Decompression

Dr S McCormick and Dr C Cook University Hospital Southampton NHS Foundation Trust



### University Hospital Southampton NHS Foundation Trust

### Introduction

The standard treatment for symptomatic Chiari malformation type 1 is Foramen Magnum Decompression (FMD), this is to facilitate cerebral spinal fluid flow through the foramen magnum, improve intracranial compliance and alleviate symptoms, commonly headache.

FMD is an area where there is currently very limited information on how to effectively manage patient's experience, in particular their analgesic requirement, during their patient pathway. We reviewed data retrospectively from 22 cases who

53% of patients routinely went to the ward postoperatively with 37% of patients being routinely reviewed by the acute pain service.



underwent FMD surgery between 2016-2018 at University Hospital Southampton. We found that our patients often reported moderate to severe pain post operatively from recovery to the ward. We also found that there appeared to be no consistent management for such patients, preoperatively, intraoperatively and postoperatively from recovery to the ward.

With the aim to produce clinical guidelines we undertook a nation survey to look at current anaesthetic practice for FMD patients.

### Methodology

Using survey galaxy we distributed an online survey to NACCS members in 2021. There was a total of 69 responses from wide number of centres. Results were analysed using excel.

### Results

Again, we found a wide variation in clinical practice throughout the patient pathway from preoperative point of care through to discharge postoperatively, particularly with choice of analgesia and antiemetics regimes. Typically post operatively analgesic regimes included paracetamol (96%) and oral morphine (90%). 27% routinely used a patient controlled analgesia (PCA), 95% of which were morphine PCAs. The majority of patients did not receive NSAIDs (81%), those that did the majority commenced NSAIDs on day 1 post operative. 94% of patients did not receive Diazepam, when prescribed routinely the majority commenced this immediately post operatively. 77% of anaesthetist did not change their analgesic regimes depending on the nature of the surgery. 67% prescribed PRN antiemetics, of which 91% prescribed ondansetron. 56% of patients were routinely catheterised. Only 3% of hospitals had guidelines in place.

### Which analgesic agents do you routinely administer Post operative?



Preoperatively 23% (16/69) of patients received patient education, 9% (6/69) received a patient information leaflet. 7% (6/69) of patients received premedication, most commonly of which was paracetamol (12%).

Intraoperatively the 3 most common analgesic agents administered were paracetamol (94%), intravenous (IV) morphine (76%) and magnesium (55%). 85% of patients receive local anaesthetic infiltration by neurosurgeons. 97% of patients received both dexamethasone and ondansetron intraoperatively. 91% of surgeons did not advise on position post operatively and if they did this again varied.

## Which analgesic agents do you routinely administer intraoperative?



	Paracetamol	Morphine IV	Morphine IM	Fentanyl	Ketamine	Clonidine	Magnesium	Answers
Series1	63	51	1	27	12	19	37	14

In recovery 84% of patient received IV morphine and 63% paracetamol.

### Which analgesic agents do you routinely administer Recovery?



We are now in the process of writing guidelines for management of patients undergoing FMD. We strive to continue to improve patient experience undergoing FMD by standardising our clinical practise with regular auditing patient experience.

We have also performed a similar survey on the management of FMD in paediatrics and hope to develop guidelines and audit practise here too.

### Acknowledgements

Thank you to all members of NACCS who took part in the survey.

### **Questions**?

Send me your question via direct message on Whova: Sarah McCormick



## Activity and impact of the @QSNeuroanaes Twitter account: an analysis of social media data

S. Connal, A. Menon, I. Adedugbe, A.M.V. Luoma National Hospital for Neurology & Neurosurgery University College London Hospitals NHS Foundation Trust



### Introduction

Social media plays an increasingly prominent role in 21<sup>st</sup> century medicine<sup>1</sup>: used for education, academic research, recruitment, & social links<sup>2</sup>.

Twitter is a commonly used social media platform with an active medical community using 'tweets', 'likes' & hashtags (eg #NACCS2021, #NeuroAnesJC, #FOAMed) to share information.

### Results

@QSNeuroanae has 649 followers (47% based in UK; 16% official accounts). Median (range) monthly increase was 13 (1-97). Median (range) monthly profile visits was 312 (104-825).

Data from 817 tweets was examined. Median (range) Tweet impressions per month were 5342 (1059-16900). The most popular tweet to date shares the department's decision to stop using Desflurane (Figure 1).

Our department at a single-specialty neuroscience centre (@QSNeuroanae) joined Twitter in October 2016, first posting on 08/10/2018. Our aim is to study the impact & activity of @QSNeuroanae.

### Methodology

We examined Twitter analytics data of @QSNeuroanae since joining. More detailed data was available from August 2020-January 2022.

Analysis using Apple Numbers included follower demographics, tracking activity (posts, new followers, profile visits) & impact (impressions, engagement, Top tweets, Top media tweets). We categorised Top tweets by content: education, department news, academic activity, & recruitment. Tweets about education & department news showed most engagement - these two categories accounted for 96% (26/27) Top tweets. 67% (6/9) of Top media tweets featured neuroanaesthesia conferences eg SNACC & NACCS.

### Conclusion

In response to this review our future strategy includes scheduling posts; reviewing analytic data in 1 year; and surveying other centres about their use of social media.

Our data highlights the relevance of Twitter for medical education & online collaboration; & provides a potential framework for developing departmental social media presence.



Figure 1: Top Tweet impressions by month from August 2020 to January 2022, including most popular posts highlighted with category and content posted

### **Questions?**

Tweet your questions to us! Start your tweet with: @Stu\_anaes @amenondr #NACCS2022 Poster 8

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## A radiological classical case of intracranial hypotension causing subdural haemorrhage, with a less than obvious management plan. Are subdural haematomas the cause, or the effect?

Dr A.C.Mitchell BMBS FRCA, Dr. H.L Fenner MBChB(hons) FRCA, Mr A.J. Leggate FRCS (Neurosug). Nottingham University Hospitals NHS Trust - Queens Medical Centre Campus

### Introduction

Subdural Haematoma (SDH), characterised by bleeding into the space between the dural and arachnoid membranes, may be spontaneous or triggered by a specific event. Head trauma is the most common cause of SDH, with intracranial hypotension occurring far less frequently.

Intracranial hypotension (low cerebrospinal fluid pressure), may also occur spontaneously or have an iatrogenic cause, such as following a dural breach of any sort (including lumbar puncture). As the CSF pressure decreases, buoyancy of the brain is reduced, the cranial cavity sags and subsequent traction on bridging veins leads to eventual tearing of these vessels and bleeding into the subdural space.<sup>1</sup>

Patient was extubated post procedure given cardiovascular and respiratory stability, reassuring arterial blood gases, and ability to assess neurology. GCS was E1V1M6. However trial of extubation failed after approximately 8 hours, and the patient was re-intubated, stayed on ICU overnight, extubated and discharged to the ward the next day.

Patient improved from a respiratory point of view, and with evidence of a full neurological recovery (GCS 15 with no focal neurological deficits by 24hrs post operatively). He was discharged following a period of rehabilitation on the ward. He remains well living independently at home. In total the patient spent 21 preoperative days and 13 post-operative days in hospital.

MRI of the craniospinal axis is the preferred modality for confirming the diagnosis. The most common abnormality is diffuse meningeal enhancement (DME), found in approximately 75% of patients with intracranial hypotension. Other abnormalities include subdural collections, pituitary enlargement, engorgement of venous structures and "sagging" of the brain.<sup>2</sup>

Classically intracranial hypotension can be treated conservatively (bed rest, hydration, analgesia) or with epidural blood patch - although the efficacy for this appears to be much lower compared to post dural puncture headache.<sup>3</sup> In true cases of intracranial hypotension, a challenge of treatment is not intervening with surgical evacuation of SDH, instead targeting the cause.

### Case History

A 59 year old presented with a one week history of headaches and blurred vision. The patient was diagnosed with bilateral subdural haemorrhages (SDH) following CT head in the absence of any clotting abnormalities, blood thinning medications or trauma.

MRI head and whole spine was performed to assess for features of low ICP and possible occult CSF leak. Neuroradiology consensus reviewed imaging showed classical features of Intracranial Hypotension including:

### Discussion

Successful surgical intervention, rapid clinical improvement without epidural blood patch, and lack of ongoing low pressure symptoms seem to contradict the initial convincing diagnosis of Intracranial hypotension. It is possible that the classic MRI features may have been a result of longstanding but decompensated SDH pushing the brain down, rather than the brain being 'sucked' downwards by low pressure.

It seems likely that the patients neurological state was a significant contributing factor to their poor respiratory effort and failed trial of extubation, given they were extubated the next day following improvement in GCS. The patient could have remained intubated for a short period post-operatively, but it was felt minimising ventilation period as well as ability to accurately assess the patients GCS was of greater benefit in this case.

An interesting point is the contention surrounding the use of epidural blood patch to treat this patient. An earlier EBP *could* have refuted the initial diagnosis and expedited surgical evacuation/potentially avoided respiratory complications, or it may have worsened the clinical picture.

There were differing reasons during this patients journey as to why they did not end up having an EBP. We believe most Clinicians would agree that injecting possible bacteraemic blood into a patient would not be advisable, and just prior to this patients surgical intervention there seemed enough clinical evidence to support this possibility. However prior to this the reasoning was due to a lack of obvious point of leak.

- Paucity of the CSF within the basal cisterns with crowding
- Drooping of the posterior corpus callosum
- Reduced CSF in optic nerve sheath complexes
- An upwardly convex pituitary
- Midbrain structure slumping with reduction of mamillopontine distance
- Smooth, symmetrical pachymeningeal enhancement following contrast





Figure A<sup>2</sup> bilateral hyperintense subdural hematomas (arrows) that compress underlying cerebral cortex. Figure B<sup>2</sup>:Sagittal post-contrast T1-weighted image: diffuse dural enhancement (dashed arrows), pituitary hyperemia (circle), and brain sagging, suggestive of intracranial hypotension.<sup>2</sup>

When does the benefit outweigh the risk of an EBP in a patient with suspected intracranial hypotension but without clear evidence of a CSF leak? There are no randomised clinical trials that assess the treatment of spontaneous intracranial hypotension, but so called "blind" EBP is a widely used intervention, can be repeated several times and does seem to confer some therapeutic benefit.<sup>3</sup> However, this does not specify any change of management plan if said intracranial hypotension is complicated by SDH (if this indeed was ever a true diagnosis of intracranial hypotension)

### Conclusion

The fact that there was rapid improvement in this patient following burr hole evacuation of the SDH, subsequent rapid mobilisation and discharge home to independent living, without EBP and ongoing low pressure symptoms, suggests that this was never a true diagnosis of intracranial hypotension.

Patients presenting with a mixed picture such as this can cause a diagnostic and therapeutic dilemma. Senior MDT discussion was essential in this complex case as the confusion surrounding diagnosis could have had devastating consequences.

A epidural blood patch was requested but initially refused given no obvious point of leak. After multiple GCS drops and respiratory complications (treated as hospital acquired pneumonia) the difficult decision was made to intervene surgically with burr hole evacuation. A concurrent blood patch was discussed but no longer an option as the patient displayed evidence of possible respiratory sepsis, thus risking epidural bacteraemia.

The patient presented to theatre with a GCS of 7 (E1M5V1) and an acute 15L oxygen requirement. CXR showed no obvious cause for acute respiratory deterioration. Consultant MDT discussion took place and decision was made that continuing would offer best chance of survival, but prognosis was still considered poor. If required the patient would receive single organ respiratory support for a short period to facilitate neurological improvement.

Bilateral Frontal and Parietal burr hole evacuation was performed under total intravenous anaesthetic. After basic physiotherapy manoeuvres and use of suction catheters the patients saturations were maintained >98% with Fi02 of on average 0.5. There were no issues with ventilation during this time.

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### **Questions?**

Please send me your question via direct message on Whova: Amy Mitchell



### **56TH ANNUAL SCIENTIFIC MEETING 2022**



## St George's University Hospitals

**NHS Foundation Trust** 

## Environmental Noise in Neuro ICU

### <sup>1</sup>Mohamed, M. MSc, <sup>2</sup>Armoogum, M., <sup>2</sup>Papel, D., <sup>2</sup>Ventura, V., <sup>3</sup>Zoumprouli, A. PhD

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### Introduction

Noise levels in ICUs in the United Kingdom are consistently above World Health Organization (WHO) recommended limits. The WHO guidelines stated the average sound level should not exceed 30 dBA in general hospital areas and 35 dBA in rooms where patients are treated or observed; the maximum sound level indoors should not exceed 40 dBA during the night or in ICUs.

Noise is generally expressed as sound pressure in decibels (dB). A-

### Results

Source of the commonest peak sounds recorded during day and night shifts:

	Highest (dBA)	Number of times recorded	Total Average(dBA)
Staff conversations	<mark>98.7</mark>	<mark>89</mark>	75.5
Closing Bins	<mark>86.3</mark>	<mark>45</mark>	79.6
Staff handover	88.9	15	80.0
Ward rounds	89.4	14	77.6
Ventilator alarms	86.0	12	78.9
Cardiac Monitor alarm	80.3	11	73.7
Nursing intervention	89.8	9	76.2
	00.4	0	70 5

Day Shift (fig. 3)

Night Shift (fig. 4)

	Highest (dBA)	Number of times recorded	Total Average(dBA)
Conversations	<mark>95.2</mark>	<mark>55</mark>	75.8
ng Bins	<mark>96.1</mark>	<mark>30</mark>	77.2
ng Intervention	97.0	24	72.4
ator Alarms	90.0	15	75.6
ac Monitor Alarm	86.4	15	74.3
e Ringing	78.9	8	71.3
nn Alarms	87.1	Q	71 1

weighted sound levels (abbreviated "dBA"), reflects the normal range of sound frequencies heard by humans.

Patients' care is disturbed by activities around them and frequently report disrupted sleep. This can lead to slower recovery and long-term health problems. Also, It may contribute to the development of delirium, which may incur longer hospital stays and develop cognitive impairment after discharge.

It can also cause sleep disorders in critical care patients, which results in inconvenience and disorder in quality of life. Increased sympathetic activity, decreased cardiac parasympathetic activity, subsequent tachycardia, cardiac arrhythmias and hemodynamic instability are among the physiological complications of sleep disorder.

In ICU, different factors contribute to high sound pressure levels, including large number of alarm-generating monitoring equipment, use of mechanical ventilators and around-the-clock activities by staff members.

### Methodology



• The mean average of all noise recorded:

Low sound 60.8±3.3

Average sound 64.2±3.8

Peak sound 74.9 ± 5.1

ver	88.2	7	80.7
Conversations	88.3	4	81.0
ctivity	92.2	3	88.0



Mean (SD) of sounds over the given days

- The mean average of the recorded peak noises in Neuro ICU is 88% higher than recommended peak noise level of 40 dBA.
- The most frequent cause of peak noise during both day and night shift was staff conversation, it was recorded 89 times with the highest peak of 98.7 dBA and 55 times at night with a peak of 95.2 dBA.
- Closing the bin was the second most frequent cause of noise during day and night shift, it was recorded 45 times with a peack that goes up to 86.3 dBA and 30 times at night with peak of 96.1 dBA.

### Conclusion

The overall noise levels in Neuro ICU were well above the WHO recommended

We collected data over the course of three months (Total of 324 hours) using the Unit mobile phone and the Decibel X Noise Meter App. *(figure1)* 

Noise levels recorded every hour, for 2 min/hour, from 3 different allocated points in the unit each hour. (*figure2*)

The lowest, average and peak steady noise dBA levels were recorded and documented. Also, the source of the activity that caused the peak noise during each recording was documented. *(figure 3, figure 4)*. One off loud noise and/or noise within 2 meters from the mobile phone were omitted.

Record sound levels from 3 areas: <u>Resus</u> trolley (1), Nurses station (2), CVC trolley (3) levels.

Quality improvement team discussed results and implemented changes to alleviate the problem. Aiming to re-audit to asses if the changes that had been introduced helped decrease noise level by at least 20% less than the current levels

Strategies to minimize noise levels:

• Encourage staff voice levels to be lowered by :

> Staff education on noise, hazards and noise reduction awareness

> **Poster** at nursing station as a reminder reduce noise.



- Sound Ear Noise Warning Sign, tracks noise and remind staff to lessen noise.(figure 5)
- Change bins and paper towel dispensers to quieter modules.
- Modification of alarms settings or using sound-activated light alarms.
- Offer earplugs to patients.
- Introducing white noise: White noise is used for noise masking. The presence of such sounds in the background makes more intense auditory stimuli less capable of stimulating the cerebral cortex during sleep.
- Quiet time (QT): Generally include restricting or limiting visitors, staff movement and conversations; closing doors or privacy curtains; during night shift anytime between 1 am to 5 am (excluding emergencies and admission).

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(fig 1)

### Acknowledgements

Special thanks and gratitude to Neuro ICU nursing staff for assisting during data collection and the whole medical staff for helping with implementing the necessary changes to improve quality of patients' care.

Questions?

Send me your question via direct message on Whova: Mohamed Mohamed



Impact of contralateral carotid disease on choice of postoperative destination and functional outcome

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### Introduction

Carotid endarterectomy (CEA) is a common method of secondary prevention of cerebral ischaemia in symptomatic carotid artery disease. The National Institute for Health and Care Excellence guideline in 2019 recommends CEA to be carried out within 14 days of onset of symptoms to reduce the risk of disabling or fatal stroke. Based on the findings of the 2021 annual report of National Vascular Registry, there is an improvement in the number of CEAs being carried out within this window, with a rise from 37% to 62% from 2009 to 2020.

### Results

The analysis shows there were similar number of patients who required blood pressure management with intravenous vasoactive drugs in the early postop period with contralateral, no contralateral carotid disease and missing data as summarized in table 1. Pearson chi-square test of independence performed to examine the relation between the presence of contralateral disease and the need for BP management postoperatively showed there was no significant correlation{ X2 (1, N = 59) = 0.845, p= 0.357958}.

**Table 1**. Summary of need for blood pressure management in those with contralateral and ipsilateral carotid disease.

Factors such as age and presence of multiple comorbidities inherently makes this patient population a high risk group for intra and postoperative cardiorespiratory and neurological complications. The presence of contralateral disease has been identified as a high risk factor for perioperative stroke in CEA patients. Therefore close monitoring of neurological and hemodynamic parameters is advocated which at present can be best carried out in a critical care setting.

At present, the routine practice at our hospital is to admit all post CEA patients to HDU to improve early detection and management of perioperative stroke and other complications. But it also means unexpected cancellations of the procedure due to lack of HDU bed availability. This unnecessary delay before surgery for lower risk patients can lead to poorer patient outcome, increased length of stay and unnecessary healthcare costs.

The aim of this service evaluation was to risk stratify CEA patients' post-operative destination based on presence of contralateral disease to reduce time interval to surgery caused by HDU bed availability.

	Presence of contralateral disease		
	Yes (n=28)	No (n=31)	Unknown (n=12)
No BP intervention postop (n=37)	12 (42.86%)	17 (54.83%)	08 (66.66%)
Required BP intervention postop (n=34)	16 (57.14%)	14 (45.17%)	04 (33.34%)

For the secondary outcome analysis (table 2), only 61 patients had complete data. Of the patients with contralateral disease (n=16), 81.2% had a mRS of  $\leq$ 2 upon discharge from the HDU while 86.6% of the patients with ipsilateral disease (n=45) had a similar score. Chi square analysis showed no significant relationship between the presence of contralateral disease and mRS at discharge {X2 (1, N = 61) = 0.2753, p= 0.599767}.

**Table 2**. Summary of MRS score on discharge from ITU in patients with contralateral and ipsilateral carotid disease.

	Contralateral Disease		Total
	Yes	No	
$MRS \leq 2$	13 (81.2%)	39 (86.6%)	52
MRS >2	03 (18.8%	06 (13.4%)	9
Total	16	45	61

Retrospective electronic record review of patients who underwent CEA from April 2020 to September 2021 at our hospital was conducted. The database consisted of 71 patients.

Mean age of the study sample was 72.7 years with a range from 44 to 88 years. Of the patients, 80.28% had cardiovascular disease (hypertension, ischaemic heart disease, congestive cardiac failure, atrial fibrillation or dyslipidaemia), 28.16% had respiratory disorders (bronchial asthma, chronic obstructive pulmonary disease, interstitial lung disease or bronchiectasis) and 35.21% had type 2 diabetes mellitus.

Number of days between index symptoms and surgery ranged from 2 to 30 with a mean of 9.66 days. 78.87% of the patients underwent CEA within the recommended window period.

The primary outcome was to determine if the presence of contralateral carotid disease is an independent risk factor for postoperative blood pressure (BP) intervention and therefore postoperative HDU bed.

The data was analysed to identify patients with contralateral carotid artery disease (>50% stenosis documented from imaging) who required BP intervention with intravenous vasopressors or vasodilators in the postoperative period

The secondary outcome was to determine the association between contralateral disease and MRS at discharge from ITU. Modified Rankin score (mRS) was calculated for each patient for the secondary outcome analysis. mRS of >2 (moderate to severe neurological disability or death) was considered as poor outcome. Within the patient database, the Based on the results of the study, presence of contralateral carotid disease can not be considered as an independent predictor of need for BP intervention or neurological outcome following CEA. The small sample size and confounding factors of cardiorespiratory comorbidities and age in this high risk group of patients may have affected the results.

Randomised controlled trials needs to be carried out to identify individual risk factors that would predict poor postoperative outcome in this patient population thereby aid in risk stratifying patients who would benefit from critical care admission postop.

Identifying patients who are at low risk of requiring cardiovascular support or neurological deterioration postoperatively following CEA and thereby would not require d postop HDU admission would significantly affect the duration between symptom onset to surgery, save HDU costs and reduce their hospital LOS especially at a time when a high demand for critical care beds exist.

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Pearson Chi-square test was used to assess correlation between variables and outcome.

### Acknowledgements

### 1. All patients involved in the study

- 2. Doctors and Consultants who contributed to the CEA database maintenance
- 3. Queen Square Quality and Safety team, National Hospital for Neurology and Neurosurgery

Questions?

Tweet your questions to me! Start your tweet with: @udayanthinana#NACCS2022 Poster



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# Awake Craniotomy in the MRI Suite a review of local practice

### INTRODUCTION

Modern awake craniotomy (AC) has been performed since the 1980s, initially for epilepsy surgery but expanding to surgery for intracranial tumours<sup>1</sup>. Intraoperative magnetic resonance imaging (ioMRI) was first utilised in 1994 in Boston<sup>2</sup>, to overcome the issue of intraoperative brain shift during craniotomy, and permit the surgical team to check the extent of resection before closing. The techniques have been more recently combined, aiming to remove as much tumour from eloquent areas as possible.

The interventional MRI (iMRI) suite at the National Hospital for Neurology and Neurosurgery (NHNN) consists of a 1.5 Tesla MRI scanner with an MR conditional anaesthetic machine and operating table just outside the 5 Gauss line. This can be rotated to connect to the MRI table, and the patient is transferred into the bore of the scanner.

There have been very few studies looking at iMRI and awake craniotomies, however there has been a suggestion that the addition of the MRI scan to awake craniotomy may reduce the requirement for redo surgery<sup>3</sup>, and that awake craniotomies in iMRI may reduce the incidence of neurological impairment compared to surgery under general anaesthesia in iMRI<sup>4</sup>.

As the number of iMRI theatre suites increases across the UK, increasingly AC is being performed in this environment<sup>5</sup>. In our study, we looked at these patients and their various pathologies, undergoing awake tumour resections in our iMRI suite, and their clinical management.

### METHOD

Electronic patient record (EPR) search by "location of surgery" as "MRI" from the past 3 years. A longer time window was selected due to the impact of covid. Records reviewed to exclude procedures other than awake tumour resections with intraoperative MRI scanning. Identified total of 21 cases, a number which was grossly affected by covid interruptions. Post operative notes and discharge letters were reviewed to ascertain Clavien-Dindo scoring for post-op complications.



### RESULTS

- 21 cases spanning 33 months, with an average patient age of 33yrs (spanning 21yrs to 72yrs), gender ratio M:F = 16:5. Mode ASA 2 (1-2), mean weight 81kg (58.2-114kg) and mean BMI 25.6kg/m<sup>2</sup> (21.3-35.6).
- Testing was performed in all cases, motor testing in 62% (n=13), speech in 57% (n=12), sensory in 1 case. In one case, speech was tested in two languages. All had a single ioMRI except one case which had 2 scans, and 50% of cases had further resection after the ioMRI. • Anaesthetic technique varied but asleep-awake-asleep/sedation comprised 86% of cases, with iGel used in 62% and classical LMA in 24%, and propofol/remifentanil used in 90%. • All patients had urinary catheters and arterial lines, no patients had central venous catheters. • Anaesthetic time (WHO sign-in to WHO time-out) ranged from 5hrs to 12hr45mins with an average of 9hrs8mins. • 42% have some form of intra-operative neuromonitoring. • All patients had ECG, IABP and SpO2 monitoring. 3 documented temperature monitoring, and 66% documented sedation capnography. Postoperative destination was overnight recovery in 76%, HDU in 14%, and the remainder direct to the ward, where length of stay mean was 10.5 days (though mode was 4days).



- - **10 Discharged with** no new deficits
- 47% of patients noted complete resection on post-operative imaging
- Clavien-Dindo score on discharge was 0 in 38%, 1 in 52%, 2 in 4% and 3b in 4%.
- 47% were discharged with no new neurological deficit



### Seizures

**1 Postoperative** 

### CONCLUSION

We interpret the outcomes here as very positive, with a high proportion of patients leaving hospital with low Clavien-Dindo scores or with no new deficits identified post-operatively.

It is clear that awake craniotomy is safely performed in the iMRI suite. As is often the case in anaesthesia, whilst we saw some absolute consistencies (such as 100% rate of urinary catheters and arterial lines), we saw here that the anaesthetic approaches were as varied as the anaesthetists themselves. Anaesthetists should be prepared for prolonged surgical time to ensure satisfactory surgical resection.

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### **ACKNOWLEDGEMENTS**

- Department of Anaesthesia, National Hospital for Neurology and Neurosurgery.
- UCLH Medical Records.

### QUESTIONS

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The management of patients with a moderate/severe Traumatic Brain Injury in a major trauma centre; A retrospective audit over an 18-month period Dr Hannah Morrison & Dr Tom Slater St George's University Hospital NICU



NHS

### Introduction

Traumatic Brain Injuries (TBIs) account for 3.4% of all yearly hospital attendances. Of these, 10.9% are 'moderate or severe', classified by a Glascow Coma Scale (GCS) of <8 (severe) and 9-12 (moderate). Moderate to severe traumatic brain injuries are the leading cause of mortality and morbidity in patients aged 18-45 years. Management is protocol-based, including prompt management of intracranial hypertension, maintenance of cerebral perfusion pressure, and ensuring adequate oxygen delivery to injured brain tissuel to prevent secondary brain injury.

### Results

Of the 158 patients, 77 suffered a severe TBI (classified as Glasgow Coma Score < 8)) with males more affected (72.8%). Of these, 27 patients met the criteria for ICP monitoring of which 23 received a bolt with a median time of 3

### Methodology

A structured proforma was designed based upon the national Brain Trauma Foundation guidelines. Data from 158 patients were collected retrospectively over an 18-month period between April 2020 and September 2021 and a comprehensive review of the notes was undertaken. An ICP was designed to improve local adherence to best practice.

hours from decision to insertion (graph 1). Of these patients, 85% had a target cerebral perfusion pressure (CPP) documented, 37.6% had PaC02 targets and only 19.3% had haemoglobin targets documented. In the severe TBI group, 50.1% received venous thrombosis prophylaxis (VTE) within a week. An IVC filter was inserted for patients who did not receive VTE prophylaxis in 10.0% of severe TBIs. 44.2% did not receive any form of VTE prophylaxis within the first 7 days of admission. Levetiracetam was prescribed at a loading dose for a 100% of patients who presented with a seizure. Hyperosmolar therapy was administered in 49.0% of severe TBIs, with a serum sodium target documented in 22.8% of this group. The median outcome at six months discharge from hospital using the Glasgow Outcome Scale (GOS) was a GOS of 3.



### Conclusion

This audit highlights the current management of patients with severe TBI's is not in complete accordance with national guidelines. Lack of awareness of guidelines may be a contributing factor. The results of this audit have led to the development of a multidisciplinary quality improvement project with





design of a an ICP whose implementation will be integral to the care of these patients.

Acknowledgements

### With thanks to Dr Ximena Watson and Dr Argy Zoumprouli.

Questions?

Send me your question via direct message on Whova: Hannah Morrison



Improving management of external ventricular drains for intrahospital transfers: Multimodal education including a novel digital information tool. A quality improvement project at University Hospitals Plymouth NHS Trust. E. Blunnie<sup>1</sup>, R. Stabler<sup>1</sup>, R. Peagam<sup>2</sup>, W. Alhalabi<sup>3</sup>, and T. Burnett<sup>4</sup>.

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### Introduction

External ventricular drains (EVDs) are placed in patients with hydrocephalus and raised intracranial pressure. These patients frequently require transfer to computed tomography scan, interventional radiology (IR) or the operating theatre.<sup>1</sup>

Serious complications can result if EVDs are improperly managed. Severe hydrocephalus can occur with under-drainage. Over-drainage can result in cerebral contraction, tearing of the bridging veins, and subdural haemorrhage. During brief intrahospital transfer over-drainage poses a greater risk than under-drainage. <sup>1,2,3</sup>

Guidelines for EVD management vary between hospitals, but specific advice for transfers

### Results continued...

"This project has brought an incredibly important issue to life to ensure patient safety" Participant Feedback

An improvement in knowledge was demonstrated, with seventy-six percent of respondents now aware that EVDs should be clamped for transfer, compared with one third in the first survey (see Figure 2).

Sixty-seven percent of respondents to the second survey stated that their overall confidence in managing EVDs had increased, and sixty-two percent said their confidence in managing EVDs for intrahospital transfer had increased as a result of project interventions. Fifty-four percent said they agreed with the novel guideline and would change their practice of managing EVDs in IR.

is limited.<sup>1,2,3</sup> Guidelines of the Royal College of Anaesthetists, the Association of Anaesthetists, and the Neuro Anaesthesia and Critical Care Society were reviewed, and it was found that there are no national guidelines for the management of EVDs during intrahospital transfer. A number of organisations in the United States offer some guidelines, albeit with conflicting advice between organisations – for example, the American Association of Neuroscience Nurses advocates for the routine clamping of EVDs on transfer, and the Society for Neuroscience in Anaesthesiology and Critical Care advocates against.

Previous local guidelines at University Hospitals Plymouth (UHP) NHS Trust made reference to the need to clamp but the advice on when to clamp was unclear. The new Trust guideline devised as part of the quality improvement project advises that EVDs should be routinely closed for patient transfer within the hospital and during short procedures.

This project aimed to provide guidance and increase clinician knowledge and confidence for the intrahospital transfer of patients with an EVD.

### Methodology

Literature search of guidelines on EVD management during intrahospital transfer was performed and reviewed with Neuroanaesthesia, Neurosurgical and Neurology Intensive Care Unit (NICU) colleagues. A new Trust guideline was created with multidisciplinary input.

### QR Code Access

The EVD guideline was viewed 98 times via the QR code within the first forty-three days. This was positively skewed towards the project launch date, but access continues to date.



**Figure 2** – There was a clear improvement in knowledge of how to manage EVDs on patient transfer

### Conclusion

The pre-intervention survey confirmed there was both a desire and need for education on EVD management during intrahospital transfer. Multimodal education has been delivered to staff who manage EVDs. Devices now display a clear visual message with a memorable reminder to clamp EVDs for transfer. Continued usage of the QR code indicates it is enabling clinicians to find point of care information at the time they need it.

Interventions included education sessions, an educational poster displayed in relevant clinical areas, a prompt to close EVDs added to the NICU patient transfer checklist, and a label for EVDs with a mnemonic and a QR code providing a link to full guidance (see Figure 1).

The label created for EVDs displays the mnemonic "CLAMP – Close Line And then Move Patient". The label was designed with bold white text on a red background and white border, to appear similar to standard safety signs (see Figure 1).

## Remember to <u>CLAMP</u>!

Two online surveys were issued, before and after interventions were made. The first survey consisted of five multiple choice questions to assess the knowledge and confidence level of clinicians involved in the care of patients with EVDs.

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A second online survey was issued five weeks after interventions were first introduced, to assess the impact of the project. This follow-up survey comprised seven multiple choice questions and one question inviting participants to provide open freetext feedback on the project and the new policy.

**Figure 1** – EVD label displaying the CLAMP mnemonic and QR code that links to guidelines for managing EVDs during transfer Follow-up audit assessed changes in clinician knowledge and confidence. The interventions resulted in clear improvement. There was uniform acceptance of the new policy, with all practitioners for whom it was applicable stating they agreed with the guideline and that they would change their practice in line with new policy.

Relying solely on education and warning signs to ensure accurate use of a safety critical device exposes a vulnerability to single point of failure. This limitation of the interventions provided to date is acknowledged. Ultimately, a better option for managing EVDs is to improve the safety of the device itself, so that safety is no longer user dependent. There are automated intraventricular ICP devices available that offer improve drainage control such as the LiquoGuard, which controls CSF drainage and measures intracranial pressure (ICP) simultaneously through one catheter. An ongoing project aim is to advocate for the introduction of automated devices at University Hospitals Plymouth NHS Trust.

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### Results

### First Survey – Before Interventions

Sixty-nine individuals involved in EVD management responded to the first survey. Respondents included anaesthetists, advanced critical care practitioners (ACCPs), operating department practitioners (ODPs) and nurses. Twenty-three percent had limited experience with EVD management, and forty-eight percent had some experience but wanted more training. Forty-two percent stated they felt unconfident or very unconfident in EVD management. Almost every respondent (99%) stated they would find further education useful. In relation to managing EVDs for intrahospital transfer of a patient, only a third stated that they would close an EVD for transfer as per the novel guideline.

### Second Survey – Following Interventions

There were twenty-two respondents to the second survey. Ninety-one percent had been exposed to one or more of the educational interventions. Fifty-nine percent recalled seeing the new EVD label or ICU checklist prompt in their clinical practice.

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### Acknowledgements

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### Questions?

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## Introduction of a crisis resource management (CRM) tool for the management of a neurosurgical emergency using 'The Blown Pupil Pathway'

**R. Steele\* FRCA, S. Kajal FRCA, A. Al-Mohammad PhD, MDM.Yacaman M.Phil**, I. Adedugbe\*MBA, P. Grover M.Sc



### Introduction

A "blown pupil" is a neurosurgical emergency and rapid surgical intervention is often required. The only neurosurgical emergency with a crisis resource management (CRM) tool in widespread use is cardiac arrest during neurosurgery.

A "blown pupil" can indicate trans-tentorial herniation and brainstem compression and can be caused by a variety of surgical reversible pathologies such as haematoma, hydrocephalus, large volume infarct or oedema surrounding tumour or infection. Rapid access to surgical evacuation of extra-axial haematomas significantly improves outcomes and is the most important factor in improving prognosis<sup>1</sup>.

### Results

In total there were 23 patients who had the blown pupil pathway activated and progressed to surgical decompression; 9 cases before the introduction of the BPP and 14 cases afterwards. Both groups had a mixture of current inpatients and patients transferred from another hospital. There was a reduction in the mean time from recognition of blown pupil in our hospital to 'knife to skin' from 151 to 78 minutes after the introduction of the pathway.

We received 46 responses to the survey in total. Although this is only an overall response rate of 17%, all clinical specialties except ward nurses are represented.

The majority of evidence for decompression craniectomy is based on traumatic brain injury. It is recommended progression to definitive surgical intervention must occur within 'the golden hour' to prevent secondary brain injury and irreversible brainstem ischaemia.

Whilst our hospital is a tertiary neurosurgical centre, we do not treat traumatic brain injuries or have an emergency department. However, we do manage a high volume of emergency cases such as complications post elective procedures, subarachnoid haemorrhages and stroke.

Our aim was to create a CRM tool for the management of patients with a blown pupil, both to improve team communication and expedite surgical decompression.

### Methodology

The neurosurgical multidisciplinary team of surgeons, anaesthetists, critical care,



93% of respondents have heard of the BPP, however only 59% know where to locate the protocol and only 52% felt entirely confident activating it. 82% felt the BPP had definitely improved or maybe improved communication between team members and 78% felt it had definitely improved or maybe improved efficiency.

Respondents agreed delays were multifactorial at each stage of the pathway although there were some common themes; obtaining group and save samples and applying patient ID wrist bands for external patients, radiographer and emergency theatre availability and patient positioning and haemodynamic stabilisation in theatre.

The most divisive question was 'where should a patient transferred from another hospital arrive?' 50% felt this should be intensive care, 41% felt it should be theatre, 7% were not sure and 2% suggested a new dedicated area.

### Conclusion

Although based on small numbers, we demonstrate a reduction in mean time to

theatre staff and departmental managers collaborated to create the 'Blown Pupil' Pathway' (BPP). This is a crisis resource management tool to be used to optimise the management of these neurosurgical emergencies. Supporting documents outline the pathway and include algorithms, specific drug dosages of hyperosmolar therapy, neuroprotective measure targets and useful contact numbers. This protocol is accessible on the intranet and on a trainee resource application. Information is disseminated at local departmental inductions for rotating doctors.

It went 'live' in August 2021 and is activated by dialling 2222 via switchboard where upon an emergency bleep is put out; rapidly communicating simultaneously to all relevant stakeholders including anaesthetists, surgeons, theatre coordinators, radiologists, radiographers and porters.

We reviewed the impact of the CRM tool by comparing the mean time from first recorded documentation of blown pupil in our hospital to 'knife to skin' before and after the introduction of the BPP.

Using our electronic patient records, we recorded the relevant times for cases between January – July 2021. We repeated this for cases between October 2021 to March 2022.

We have also conducted a subjective evaluation of the BPP via a staff questionnaire on google forms comprising a mixture of multiple choice questions and free text boxes. This was emailed to 278 staff members including neurosurgeons, anaesthetists, operating department practitioners, theatre and recovery nurses, critical care and

surgical decompression by implementation of a CRM tool. The BPP provides a structured workflow for team members who may not have worked together previously, in time critical cases, out of hours.

This study has demonstrated that we can use the BPP to provide baseline data to benchmark and monitor the ongoing efficiency of the BPP. The survey highlights several aspects that we can endeavour to improve in order to optimise the pathway further.

Some simple changes we can make include improving awareness by ensuring the BPP is explained at induction for all clinicians, providing laminated copies of the protocol in all clinical areas and including the BPP emergency call on the intensive care doctors bleep. We are going to consider the suggestion of having a BPP co-ordinator akin to trauma and having a BPP 'grab box'. The more challenging, rate limiting areas will be radiographer and emergency theatre staff availability and safely expediting the pathway for transferred patients.

We believe the BPP concept could be applicable and transferrable to teams in referring hospitals preparing patients for transfer to neurosurgical centres for definitive management.

outreach and ward nurses.

### Acknowledgements

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### **Questions?**

Send me your question via direct message on Whova: Rachel Steele







Cambridge University Hospitals NHS Foundation Trust

## Evaluating the communication of antithrombotic management plans and follow-up advice in patients undergoing surgical evacuation of chronic subdural haematoma

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### Introduction

Chronic subdural haematoma (cSDH) is a common neurosurgical condition, mainly affecting older patients [1], a cohort who may suffer significant comorbidity and polypharmacy. Antiplatelet and anticoagulant use is common in this cohort. Inter-hospital transfer poses challenges in communicating perioperative changes to these medications between teams. [2] We sought to evaluate the communication of changes to antithrombotic medications, as well as general follow-up advice, upon repatriation to referring hospitals.

### Methodology

As part of a single-centre UK service evaluation (PRN8889), all cases of cSDH referred from local district hospitals who underwent surgical evacuation from March 2019 to March 2020 were identified from the referrals database (Fig. 1). Antiplatelet/anticoagulant medications were identified from admission clerking and post-discharge plans identified in discharge summaries (coded as per Table 1). General followup guidance (e.g., red flag symptoms, driving advice) was



Figure 2. Perioperative drug plans by drug type.

Plans considered 'unclear' (i.e. deferred responsibility or none) applied in **13 (42%)** of anticoagulants and **20 (43%)** of antiplatelets.

Time-dependent restarting of these drugs (n = 28) used periods between **4 days** and **3 months**, with a modal time of **2 weeks** (n = 13, 46%).

### also recorded.





	Results
Variable	Median (IQR)



Figure 3. Number of patient discharge summaries featuring specific communication components.

Only 7 of the discharge summaries communicated specific

Age (years)	78 (71-84)
CHA <sub>2</sub> DS <sub>2</sub> -VASc score	3 (2-4)
HAS-BLED score	1 (1-2)
Variable	n (%)
Male	111 (68.1)
Drives*	81 (49.7)
Anticoagulants	31 (19.0
Antiplatelets	47 (28.8)

Table 2. Demographics of surgically evacuated adult cSDH cohort. \*As per clerking.

concerning symptoms that should prompt seeking medical advice.

### Conclusion

Communication of plans for anticoagulant/antiplatelet medication was inconsistent in both incidence and content, with patients on antiplatelets more often discharged without a clear plan. Our findings have implications both for patient safety and health service workload.

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## Understanding care outside of the neurosurgical centre in patients with chronic subdural haematoma: a multi-centre study from the East of England.

Khanna S, Davies BM, Burnstein R, Joannides A, Stubbs DJ for the SENIOR-C Investigators University of Cambridge Division of Anaesthesia, Department of Clinical Neurosurgery

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### Introduction

**Chronic Subdural Haematoma (CSDH) is a common neurosurgical** condition

In excess of 90% of cases may be diagnosed and referred from secondary care (Stubbs et al BMJ Open 2020)

Most research focuses on care within neurosurgical units. This rarely

Results

n = 382 patients from 6 referring hospitals in the East of England



### accounts for DGH care (Figure 1).

This project sought to evaluate the outcome and management of patients with CSDH outside of the NSU.





**Figure 1:** The interconnected care of patients with CSDH. This study sought to examine care across both secondary and tertiary care (green oval)

### Methodology

**Approved by all participating centres as multi-site service evaluation** (CUH reference: PRN8889)

**Approval from Caldicott guardian in each centre with signed data** transfer agreements

NHS numbers of patients who underwent operative care of CSDH between November 2014 and March 2020 securely shared with lead in each referring hospital

Anonymised data on secondary care length of stay, readmissions and complications collected by local care teams

Data from six regional hospitals was collected (n = 382 patients)

Conclusion

### 48% of those repatriated after cSDH surgery require treatment for an inpatient complication

### **Median total hospital stay amongst repatriated patients** was more than three weeks



**Nearly ¼ of patients discharged from secondary care were** readmitted in the following six months.

### Acknowledgements

### Acknowledgements

This project was made possible by funding from the Addenbrooke's Charitable Trust (ACT) DJS is funded by the Wellcome Trust via a Clinician PhD Fellowship (220542/Z/20/Z) BMD is funded by the NIHR via a clinician doctoral fellowship This project also benefited from support from the Cambridge NIHR BRC.

### **Questions?**

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and/or

Send me your question via direct message on Whova: Samuel Khanna, Daniel Stubbs



Cambridge **University Hospitals NHS Foundation Trust** 







Improving Care in Elderly Neurosurgery Initiative



### Haemostasis:

How far to we go to prove coagulation is

normal?



University Hospitals Coventry and Warwickshire NHS Trust

Dr Sebastian Tanner, Dr Matthew Bishop, Dr Thomas Trouton, Dr George Madden University Hospitals Coventry and Warwickshire

Introduction

Perioperative bleeding is an important complication for patients undergoing a craniotomy

There is limited evidence, however, to predict which patients are likely to bleed significantly when there has been no prior diagnosis of a bleeding disorder Results

### 46 patients were included in the analysis

Number of Clotting Studies Undertaken Prior to an Elective Craniotomy



Furthermore, the National Institute for Health and Care Excellence exclude neurosurgical procedures from their guidance on pre-operative testing <sup>(1)</sup> 24%
24%
52%
No Studies
Two Studies
More than Two Studies

At University Hospitals Coventry and Warwickshire (UHCW), patients attending their pre-operative assessment prior to an elective craniotomy typically have an individualised bleeding risk score undertaken in addition to bloods sent for clotting studies None of the cohort returned an abnormal clotting result

Only four patients had an EBL of more than 500mls. None of those patients had abnormal clotting studies, or a positive bleeding score preoperatively

Three patients scored on the bleeding questionnaire, but each had a theatre EBL of less than 500ml

### Methodology

### Conclusion

### Over a 12-month period we undertook a retrospective analysis of all patients undergoing an elective craniotomy at UHCW

### Using e-records we reviewed:

- Blood test results
- Documentation of the pre-operative assessment

Screening of coagulation is unlikely to reveal an abnormality in patients with no prior diagnosis of bleeding problems.

Due to concern regarding bleeding for craniotomy patients, a large proportion had multiple coagulation studies analysed, with no clear benefit to repeated testing.

The use of a verbal bleeding risk assessment was not shown to be inferior to coagulation testing in predicting which patients would bleed heavily perioperatively.

### • Estimated blood loss (EBL)



### Acknowledgements

1. National Institute for Health and Care Excellence. Routine preoperative tests for elective surgery. NICE Guideline [NG45]. 2016. Available from https://www.nice.org.uk/guidance/ng45. [Accessed 14<sup>th</sup> March 2022]

Questions?

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## Evaluation of Analgesia Provision for Elective Craniotomy

Dr Peter Tsim - Senior Clinical Fellow in Neuroanaesthesia Dr Helen Fenner - Consultant Anaesthetist

Department of Anaesthesia, Queens Medical Centre, Nottingham



### Introduction

Pain after elective craniotomy is traditionally under-diagnosed and managed inadequately. Patients are sometimes unable to communicate their pain and there is a belief that opioids hinder

### Results

In total, we reviewed the notes of 36 patients. 18 patients had scalp block with systemic opiates, 11 patients had surgical local anaesthetic infiltration with systemic opiates, and 7 patients

neurological assessment and can cause hypercapnia, which increases intra-cranial pressure. As a result, previous work suggests that 55% of patients have moderate to severe pain in the first 24 hours, and 32% continue to have pain after 48 hours<sup>1</sup>.

had opiates only. Patients who had local anaesthetic infiltration and morphine required the least rescue opiate in recovery and had the lowest total peri-operative opiate requirement. In contrast, if oxycodone was used, more of it was needed. Scalp block did not reduce the amount of opioid needed.

### Methodology

We randomly selected 36 patients who had elective craniotomies at Queens Medical Centre in Nottingham for this snap shot exercise. We excluded patients who had posterior fossa or

### Conclusion

The results showed that local anaesthetic infiltration with intravenous morphine appears to be the optimum strategy in this cohort of patients. Post-operative GCS does not seem to

awake craniotomies and patients with chronic pain issues.

be affected in the majority of cases by systemic opiates. However, we recognise the limitations of this study including small numbers and the presence of numerous other confounding factors. Future work will focus on collecting more data and including the use of gabapentin, lidocaine, magnesium and non-steroidal antiinflammatory drugs.

Figure 1. Graph showing the opiate requirements for patients undergoing elective craniotomy







## EVALUATING THE QUALITY AND EFFICIENCY OF THE TRANSFER OF CRITICALLY UNWELL NEUROSURGICAL PATIENTS TO ROYAL HALLAMSHIRE HOSPITAL FOR URGENT NEURO CRITICAL CARE OR NEUROSURGICAL INTERVENTION



Dr. Prateek Verma, Lewis Pressley, Dr. Emma Temple

Department of Neuro Anaesthesia and Neuro Intensive Care, Royal Hallamshire Hospital (RHH)

Introduction	Methodology
The Royal Hallamshire Hospital (RHH) receives critically unwell neurosurgical patients who have undergone urgent transfer for time critical interventions.	<ul> <li>Audit</li> <li>Level 2 and 3 transfers to RHH for neurosurgical or critical care intervention between 1/2/21 and 30/6/21 (n=106)</li> <li>Data collected from transfer forms and electronic patient records (epr); staff training status, time of initial CT to RHH arrival ETCO2, SpO2, Systelia RR and electronic patient records (epr); staff training status, time of initial CT to RHH arrival. ETCO2, SpO2, Systelia RR and electronic patient records (epr); staff training status, time of initial CT to RHH arrival.</li> </ul>
Anecdotally, time critical transfers are often undertaken by staff with limited training. This has the potential to result in increased morbidity and mortality through inadequate neuro protection and unnecessary delays.	• Audited against national guidelines <sup>1,2,3</sup> .
We completed a retrospective audit and trainee questionnaire to better understand these concerns.	Questionnaire Anonymised, electronic questionnaire sent to anaesthetic trainees and staff grades (n=40)

Results



Due to poor documentation and ad hoc use of electronic patient records, it was near impossible to collect accurate and meaningful data.

We have developed a multi-faceted approach to tackling shortcomings:

1. Neuro transfer checklist and information sheet - to inform and empower staff to optimise patients and reduce delays. In conjunction with a new network form, this will be used to collect data for re-audit in 6 months.

2. Regionally accessible, online neuro transfer educational package.

- 3. Creation of a new transfer training course in conjunction with the local critical care network.
- 4. Series of lectures to improve transfer form and electronic patient record completion.

![](_page_24_Figure_14.jpeg)

![](_page_24_Figure_15.jpeg)

![](_page_24_Figure_16.jpeg)

![](_page_25_Picture_0.jpeg)

# Patient Perspectives on the delivery of care for chronic subdural haematoma in the East of England

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### Introduction

Chronic subdural haematoma (cSDH) is a common neurosurgical condition in older patients. Recent work suggests that operative caseloads may increase by over 50% over the next 20 years<sup>1</sup>.

### Intention

We wanted to understand patient perspectives on care as well as their level of satisfaction, as part of an ongoing quality improvement

### Results

209 partial or complete responses (of 430 surveys) – 49% response rate

Overall satisfaction with care was high (85% giving a score of 8 or higher). There were high levels of trust in the doctors and nurses treating the patients (>84%).

### initiative, with the intention of improving patient flow and outcome in the management of cSDH.

1: 'Incidence of chronic subdural haematoma: a single centre exploration of the effects of an ageing population with a systematic review of the literature.' Stubbs DJ, Vivian ME, Davies B, Ercole A, Burnstein R, Joannides A Acta Neurochirurgica. 163, pages2629–2637 2021

### Methodology

### Scope

In collaboration with our Patient Satisfaction team, We designed a survey to evaluate care and satisfaction of patients who underwent cSDH surgery between November 2014 and March 2020.

### Identification of patients

Patients who underwent surgery between these dates were extracted from the neurosurgical referrals database.

### Survey

Surveys were posted to patients surviving up to July 2021. The survey encouraged assistance from relevant family members or carers to complete. Alongside multiple choice (Likert scale) questions, four offered free-text responses.

### <u>Key concerns</u>

 Transfer distances to neurosurgical unit (Patient factors: Transfer box in Figure 1), making relative visits difficult.
 Patients reported cancellations and prolonged fasting (Service capacity responses at Preoperative optimisation/intraoperative boundary in Figure 1).
 Communication was poor at multiple points in the patient journey, particularly prior to discharge

22% of patients (57) reported they would have wanted more information at the point of discharge, suggesting that printed information leaflets would be helpful.

Figure 1: Patient perspectives on challenges of cSDH care: n = 209

![](_page_25_Figure_24.jpeg)

### Thematic Coding

Free-text responses were thematically coded using inductive framework analysis by two reviewers (MV, SK) and arbitrated by a third (DS).

These were then amalgamated to six overarching themes (Table 1) and mapped against stages of perioperative care.

<b>Over-arching theme</b>	Examples
Patient Factors	Age, comorbidities, relatives,
	carers
MDT	Specific specialties (e.g.
	Neurosurgeons, anaesthetists)
<b>Disease and Outcome</b>	Pertaining to the cSDH disease
	process
Communication	From and between medical
	teams
<b>Service Capacity and Pressures</b>	Bed occupancy, specialist
	capacity, staffing
Pathways, protocols, logistics	Current referral paths, hospital
	resources

![](_page_25_Figure_29.jpeg)

Depth of colour proportional to number of responses of that type

### Conclusion

Patients were broadly happy with their clinical care
Transfer distances and delays to surgery appear to be major patient concerns.

Provision of written information may be of benefit to

 Table 1: Over-arching themes for inductive analysis

![](_page_25_Picture_35.jpeg)

Patients and families.
We are in the process of developing better educational materials for patients, their families, and healthcare professionals

### **Questions?**

Tweet your questions to me! Start your tweet with: @MarkEVivian #NACCS2022 Poster

and/or Send me your question via direct message on Whova: Mark Vivian

### Acknowledgements

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![](_page_26_Picture_0.jpeg)

VTE Risk Assessment within 6 hours of admission and Proper documentation of rationale for not giving Pharmacological VTE Prophylaxis in Neuro Intensive Care Unit

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### Introduction

Hospital associated venous thromboembolism (VTE) is a major safety concern for all patients admitted to hospital, accounting for an estimated 25,000 deaths in England each year, a substantial proportion of which could be prevented with thromboprophylaxis.

This Audit has two parts: The first part consists of VTE risk assessments of patients and the second is about documentation of rationale for not administering pharmacological VTE prophylaxis.

### Results

- 59 patients were admitted in NITU between 1st May and 31st May 2021, while 55 patients were admitted in the month of December 2021, who had high risk of venous thromboembolism. Almost Half of them i.e 50.8% of these patients were assessed for VTE risk within 6 hours of their admission to NITU in the month of May 2021 which slightly improved to 54% in the month of December 2021.
- The results of this study showed that overall 77% were in accordance with OUH VTE local guidelines to document reasons for withholding pharmacological prophylaxis in the month of May, with a slight increase in compliance seen in the month of December 2021 i.e 79.4%.

Oxford University Hospitals NHS Foundation Trust (OUHFT) local VTE prevention guidance is based on NICE NG89 'Venous thromboembolism in over 16s: reducing the risk of hospital- acquired deep vein thrombosis or pulmonary embolism'.

According to NICE Guidelines NG89, All patients should be risk assessed on admission to hospital: "Assess all Medical, Surgical and Trauma patients to identify the risk of VTE and bleeding:

 as soon as possible after admission to hospital or by the time of the first consultant review"

And according to OUHFT Local VTE prevention guidance: All patients aged 16 or older admitted to OUHFT must be VTE risk assessed within 6 hours of admission.

The purpose of this audit is to assess compliance within the neurosciences intensive care unit by using the VTE risk assessment tool at the time of admission. Patients should be assessed regularly throughout their stay, as their clinical condition changes. Risk assessments should be documented and completed using the electronic VTE risk assessment form within EPR. Those identified as having a risk of VTE must be offered appropriate management as soon as possible after assessment has been completed. All eligible patients should have appropriate VTE prevention measures administered within 14 hours of admission.

The completed VTE risk assessment will provide a recommendation for appropriate thromboprophylaxis for patients.

The second part of this audit assesses compliance with guidelines set by OUH Trust about documenting reasons for not giving pharmacological VTE prophylaxis in the medical notes. "It is imperative that this guidance is considered unless there is a clinical reason not to. In this case, the reason must be documented in the medical notes, and the patient should be re-assessed regularly as clinical condition changes".

- In the Neuro ICU setting, Morning and Afternoon ward rounds are led by the consultants and decisions about chemical VTE prophylaxis are made during these rounds. 64% ward round notes specified the causes of avoiding chemical prophylaxis which has Significantly improved to 80% in the month of December 2021.
- The percentage of daily medical reviews of patients admitted to NITU has significantly improved from 40% to 64.7% in the second cycle of the audit.
- The percentage of Night progress notes in the month of May 2021 almost doubled to 60.8% in December 2021 regarding proper documentation of evidence as to why we weren't giving VTE prophylaxis to these high risk patients.
- Among all medical notes in both audit cycles, admission notes had the highest percentage of poor documentation i.e 35% and 26.8% respectively.

![](_page_26_Figure_20.jpeg)

This Audit has two cycles. The first cycle was conducted in the month of May 2021 and the second was in the month of December 2021. Certain recommendations were set in the first cycle of this audit, which were implemented during data collection up until the second cycle in the month of December. Results were compiled and compared in the end.

### Methodology

This audit has two cycles. Electronic medical notes including Neuro intensive care unit admission note, Morning and Afternoon ward round, Daily Review, Night review and Discharge summary of those patients who were not eligible for pharmacological prophylaxis were reviewed retrospectively over a one month period from 1st May to 31st May 2021 for the first cycle and from 1st December to 31st December 2021 for the second cycle, and the results were compared.

### 77% 79.4% Conclusion

The results of studies conducted in the month of May 2021 and December 2021 showed a 50% and 54% compliance respectively, to the VTE Risk Assessment as per NICE Guidelines, and the adherence to OUH VTE local guidance regarding proper documentation of contraindications for giving chemical prophylaxis was 77% in the first cycle, which slightly increase to almost 80% in the second cycle of the audit after implementation of recommendations set in the first cycle of the audit.

### Acknowledgements

- 1. Assess patients for having risk of Venous thromboembolism at the time of their admission in the hospital or within 6 hours as per guidelines.
- 2. Improve documentation of VTE prophylaxis in patient records by implementing Oxford University Hospitals VTE local guidance in our daily practice in NITU.
- 3. Acknowledgement of early risk assessment and proper documentation as part of the

VTE Risk assessment forms were used to study timeframes in which VTE risks were assessed in all patients admitted over the same time periods.

These medical notes of patients were followed until they got discharged or chemical prophylaxis was commenced. Moreover, those medical notes were studied as well In which chemical prophylaxis was suspended during their stay in NITU in view of surgery or any other cause.

The following interventions were carried out prior to the second cycle of audit :

- Results of the first cycle of audit were presented and shared to the NITU department and teaching was done on VTE risk assessment tool and documentation regarding VTE prophylaxis.
- 2. Hard and soft copies of the guidelines were provided to the staff and doctors of the department.
- 3. Early risk assessment and proper documentation were introduced as part of the induction for new trainees/juniors or locum doctors from other departments.

- induction for new trainees/juniors or locum doctors from other departments.
- 4. Audit in your respective departments to assess the compliance to NICE guidelines regarding VTE Risk Assessment and documentation.

**Questions?** 

![](_page_26_Picture_39.jpeg)