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| Specialty: Neurosurgery | Procedure: Supratentorial craniotomy |

Procedure-Based Assessment Validation: Supratentorial craniotomy (to be used for training assessor)

Trainees should carry out the procedure, explaining what they intend to do throughout. If the trainee is in danger of harming the patient at any point s/he must be warned or stopped by the trainer immediately.

| **Competencies and Definitions** | **Positive Behaviors**(doing what should be done) | **Negative Behaviors**(doing what shouldn’t be done) | **Negative – Passive Behaviors**(not doing what should be done) |
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|  I. Consent |
| C1 | Demonstrates sound knowledge of indications and contraindications including alternatives to surgery | Explains using examples relevant to the patient:* Principle benefit of operation
* Subsequent improvement of function
* Limitations of surgery
* Consequences of not having surgery
 | Expresses unrealistic views of the improvement in function expected following the procedure | Fails to point out the limitations of the operation |
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| C2 | Demonstrates awareness of sequelae of operative or non-operative management | Describes consequences, agrees expectations and checks patient understanding | Is over confident in describing consequences, reinforces patient’s unrealistic expectations | Fails to mention key inevitable consequences |
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| C3 | Demonstrates sound knowledge of complications of surgery | Explains in priority order the complications likely to occur in terms of commonality and in terms of seriousness (e.g. bleeding, neurological deficit) | Spends time explaining rare complications and fails to mentions commoner ones (e.g. cerebellar deficit) | Misses out one or more major complication(s) when explaining to trainer or patient (e.g. seizure) |
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| C4 | Explains the perioperative process to the patient and/or relatives or carers and checks understanding | Describes what will happen throughout the management of the condition, indicating clear post-operative milestones, giving a rough idea of time involved and specifying who will do what. Questions the patient to check that their expectations are realistic and they have understood fully (e.g. expected length of stay and the course of management: ICU to general ward) | Uses technical terms, explains too quickly and does not check understanding (e.g. pseudomeningocele) | Misses out common events, particularly those likely to happen in the early post-operative period (e.g. CNS infection) |
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| C5 | Explains likely outcome and time to recovery and checks understanding | Expresses sensible prognosis and clear has knowledge of the current outcome data (e.g. prognosis from local data) | Expresses over optimistic outcomes and glosses over realistic difficulties (e.g. comparable to literature’s standard) | Fails to check that the patient has understood by actively listening to the patient’s reiteration of what is being said to them (e.g. inadequate question time for patients) |
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| II. Pre-operative planning |
| PL1 | Demonstrates recognition of anatomical and pathological abnormalities (and relevant co-morbidities) and selects appropriate operative strategies/techniques to deal with these e.g. nutritional status | Articulates the realistic clinical findings against any investigative findings and achieves a balance between the two (e.g. ECOG for cancer, K-score for tumour, MRS for stroke) | Describes an operative plan without the full use of the clinical and investigative material (e.g. operate on a patient with short life expectancy) | Fails to take into account specific medical conditions that might limits the technical choices (e.g. renal failure with bleeding tendency) |
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| PL2 | Demonstrates ability to make reasoned choice of appropriate equipment, materials or devices (if any) taking into account appropriate investigations e.g. X-rays | Draws, writes or iterates pre-operative plan (e.g. prepare stereotaxy) |  | Fails to check the notes for relevant or unexpected findings. Does not take into account investigative findings when planning or selecting the equipment (e.g. does not platelet for patients on Aspirin) |
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| PL3 | Checks materials, equipment and device requirements with operating room staff | Either personally visits or rings up the operating theatre to check on equipment availability (e.g. USG) | Delegates the task to a more junior team member with no plans to check the instruction has been carried out | Fails to communicate with the theatre staff |
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| PL4 | Ensures the operative site is marked where applicable | Personally marks the site | Delegates the task of marking the site to a junior doctor or nurse | Fails to check that the site has been marked |
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| PL5 | Checks patient records, personally reviews investigations | Ensures that the relevant information such as investigative findings are present, checks wristband | During the procedure asks theatre staff to look something up in the notes | Fails to check notes to ensure all information is available that is needed |
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| III. Pre-operative preparation |
| PR1 | Checks in theatre that consent has been obtained | Checks the consent form in the notes | Leaves the consent checking to nurses or junior medical staff | Makes no effort to check consent form in the notes |
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| PR2 | Gives effective briefing to theatre team | Checks with nurse that they have all equipment needed ready to hand and discuss planned actions (eg. do a timeout with the entire team) | Complains when something is not available during the procedure. Asks for something which results in theater staff going on a hunt for it | Makes no attempt to discuss operation with team |
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| PR3 | Ensures proper and safe position of the patient on the operative table | Prior to scrubbing supervises the position of the patient | Delegates the task to a theatre orderly and does not check | Concentrates on the process of scrubbing up while the patient is being transferred onto the operating table |
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| PR4 | Ensures proper and safe position of the patient’s head | Ensures the head of the patient is safely placed on headrest / Mayfield head clamp. Positions the patient’s head (e.g. Operative field at the highest point) according to the planned surgical approach taking into consideration of clinical conditions and anatomical variation | Leaves the headrest or Mayfield head clamp unlocked. Position of the head incompatible with the surgical approach planned | Fails to check the patient’s head position |
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| PR5 | Ensures proper and safe positioning of headpins in cases where Mayfield head clamp is being used | Informs anesthetist about putting on head clamp. Makes sure the headpins do not slip, or causing any impingement onto the scalp, or being placed onto the temporalis muscle | Places headpins at insecure positions or may cause muscle bleeding | Fails to inform anesthetist about putting on head clamp or to check the position of headpins |
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| PR6 | Checks the positioning of all the body parts of the patient | Checks:* Neck position for airway, venous drainage of the brain and brachial plexuses
* All pressure points packing e.g. elbows and ankles
 | Delegates the task to a theatre nurse or orderly and does not check | Fails to check the positioning of the patient’s at risk area |
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| PR7 | Demonstrates careful skin preparation | Supervises painting of the operative field, ensures the material covers the whole surface (e.g. adequate contact time of antiseptic) | Paints (or supervises) the operative field leaving gaps or inadequate coverage | Delegates painting to an unsupervised member of the team or fails to check that the area has been adequately painted |
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| PR8 | Demonstrates careful draping of the patient’s operative field | Drapes (or supervises draping of) the operative filed to adequately expose site ensuring only prepared site is exposed | Exposes an inadequate area for the incision/access | Fails to secure drapes adequately |
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| PR9 | Ensures general equipment and materials are deployed safely (e.g. catheter, diathermy) | Checks with the anesthetic nurse that the diathermy has been placed well away from any existing metal implants | Delegates the task unsupervised to the anesthetic nurse or orderly | Fails to check metal contact of the patient to prevent burn injury |
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| PR10 | Ensures appropriate drugs administered | Checks notes, liaises with anesthetic team to ensure prescribed drugs (e.g. Mannitol) administered | Assumes drugs have been administered without checking | Fails to check with anesthetic team that drugs have been administered |
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| PR11 | Arranges for and deploys specialist supporting equipment (e.g. Image intensifier) effectively | Briefs and discusses with the team where equipment is to be placed relative to the operative field | Takes no regard of where equipment is placed such as diathermy scabbard and/or places it in a position where the devices can’t be used safely  | Ignores the set up procedure in the immediate pre-operative period and has a conversation with a third party |
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| IV. Exposure and closure |
| E1 | Demonstrates knowledge of optimum skin incision | Verbally states or marks with a pen the anatomical landmarks prior to making the incision | Makes an incision that is clearly too small or too large | Does not extend an incision when struggling for access |
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| E2 | Plans the appropriate craniotomy / burr hole(s) | Designs the craniotomy / burr hole(s) (e.g. burr hole away from sinus) according to investigations findings and clinical situation | Makes the craniotomy / burr hole(s) that provides not adequate exposure on intracranial structures | Does not extend the craniotomy / burr hole(s) when clinical and investigation (e.g. stereotaxy, intra-op USG) finding confirmed inadequate exposure |
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| E3  | Achieves an adequate exposure through purposeful dissection of dura. Identifies and protects all surrounding structures | Gives a running commentary to the trainer of the structures encountered / anticipated to be encountered. Implements measures to protect surrounding structures which are at risk of damage during dissection and retraction | Describes the structure encountered in the dissection in the wrong location. Damages surrounding structures during the dissection inadvertently. Exposes structures which are clearly unnecessarily or inadequately exposed | Tries to maintain the standard approach despite the fact that access is proving difficult. Fails to recognize and adjust to anatomical variation |
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| E4 | Closes the dura sensibly and carefully | Sutures dura carefully with protection to underlying brain. Achieves watertight closure when CSF leakage is a risk. Applies suitable dural substitute where appropriate | Damages underlying brain or surrounding venous channels during closure of the dura | Fails to identify risk of CSF leakage. Does not adopt appropriate procedures or apply dural substitute as required |
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| E5 | Completes a sound wound repair where appropriate | Closes each layer without tension | Ties very tight sutures, clearly strangulating soft tissue | Leaves too large a gap between sutures so that structures are not properly opposed |
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| E6 | Protects the wound with dressings, splints and drains where appropriate | Personally supervises the application of the wound dressing | Walks away from the operating table without briefing the assistant or the nurse on what they require to cover the wound | Fails to specify required dressing |
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| V. Intra-operative technique |
| IT1 | Follows an agreed, logical sequence or protocol for the procedure | Justifies actions at any point in procedure (e.g. devascularize or debulking the lesion) | Spends a lot of time removing superfluous tissue | Fails to formulate an alternative plan when difficulty is encountered |
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| IT2 | Consistently handles tissue well with minimal damage | Personally places self retaining retractors and checks whether the skin is under tension | Pull and tears tissue. Allows the wound edges to become dry | Fails to recognize tissue damage |
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| IT3 | Controls bleeding promptly by an appropriate method | Responds calmly by applying pressure initially, briefs the team about what will need to be done – e.g. asks assistant to be ready for diathermy | Grabs in non-systematic manner at soft tissue and indiscriminately applies diathermy. Continues with a dissection despite welling up of blood in the field | Fails to act calmly. Fails to brief team. Fails to control blood flow |
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| IT4 | Demonstrates a sound technique of knots and sutures / staples | Draws soft tissue together without tension and forms proper reef knots | Pulls tissues tight so that the tissues blanche and wound gapping | Fails to use the correct method or technique |
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| IT5 | Uses instruments appropriately and safely | Asks for instruments in a timely manner anticipating what is needed  | Uses an instrument for a purpose it is not intended. Takes whatever is given to them then complains | Fails to ask for correct instruments at the correct time |
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| IT6 | Proceeds at appropriate pace with economy of movement | Let the nurse know what is to be done or needed next(e.g. bring in microscope and micro-instrument ready etc..) | Stops and starts, picking things up and then putting them down without using them. Spends a long time on a task not appropriate to the pace | Spends a long time on a task not appropriate to the pace |
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| IT7 | Anticipates and responds appropriately to variation e.g. anatomy | When encountering something unexpected stops and verbalizes concerns with the team e.g. management of cerebral herniation | Persists in a task that is proving difficult and has to be stopped | Fails to recognize anatomical variation and has to be stopped |
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| IT8 | Deals calmly and effectively with unexpected events / complications | Verbalizes that there is a problem and briefs the team on what needs to happen next | Verbalizes negative concerns and issues conflicting instructions. Tries to continue inappropriately (has to be stopped) | Fails to brief the assistant adequately |
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| IT9 | Uses assistant(s) to the best advantage at all times | Briefs assistants and places them and the instruments where they are needed | Accepts whatever assistant does irrespective of whether or not appropriate | Fails to brief the assistant and expresses irritation when positions are not what are required |
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| IT10 | Communicates clearly and consistently with the scrub team | Sets positive tone with appropriate greeting. Asks for instruments clearly. Informs as to next steps. Asks for instruments by correct name | Uses rough or inappropriate tone of voice or words. Uses slang or local description so instruments | Gives no greeting, does not ask for anything (but expects to be given it) |
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| IT11 | Communicates clearly and consistently with the anesthetist | Sets positive tone with appropriate greeting. Sets clear goals and expectations | Proceeds with next step of procedure without anesthetic advice (where required) | Fails to inform anesthetist of key phase requiring anesthetic cooperation |
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| IT12 | Elevates scalp flap and protects important anatomical structures | Turns the scalp flap in planes that can protect important anatomical structures e.g. plan incision on hair bearing area | Dissects in the wrong plane and puts important anatomical structures | Fails to recognize the correct plane for dissection or ignores the danger of injuring important anatomical structures |
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| IT13 | Drills burr holes as appropriate and creates an adequate craniotomy | Makes the burr holes at the appropriate sites. Creates the craniotomy adequate enough for exposure e.g. avoid underlying dural sinuses | Drills the burr holes at inappropriate sites. Damages underlying dura mater +/- brain due to inadvertence | Unambiguously under / over-estimates the size of craniotomy required |
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| IT14 | Hitches and opens dura mater in safe and efficient manner | Controls epidural bleeding and opens the dura mater while protecting the underlying brain with appropriate size | Damages underlying brain during opening of the dura mater | Fails to control epidural bleeding efficiently |
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| IT15 | Appreciates the important functional area and dissects along the cerebral natural planes | Identifies the sulci, cisterns or fissures concerned; anticipates and protects relevant anatomical structures dissects skillfully and gently | Dissects carelessly; damages the anatomical structures inside the cisterns | Fails to identify and dissect cisterns and their contents |
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| IT16 | Watertight dural repair (either primary closure or with duroplasty)  | Performs watertight dural repair  | Inability to make an effort to perform watertight dural closure or perform measures to reduce postoperative CSF leak e.g. lumbar drain or EVD insertion  | Failure to appreciate the importance of watertight dural repair with unambiguous disregard for CSF leak prevention |
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| IT17  | Anchoring of bone flap (either by suturing or by commercial fixation device)  | Performs secure anchoring of bone flap by appreciating the importance of three-point fixation | Insecure bone flap placement with loosening | Failure to appreciate the need for secure bone flap fixation |
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| IT18 | Layered closure of scalp | Performs satisfactory layered scalp wound closure with adequate wound edge apposition | Scalp wound stepping, gapping, overly tight tissue apposition that may result in poor wound healing, infection or CSF leak | Does not perform layered scalp wound suturing that may result in poor healing, infection or CSF leak |
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| VI. Post-operative management |
| PM1 | Ensures the patient is transferred safely from the operating table to bed | Personally takes part in the transfer of the patient from the operating table to the bed | Leaves the operating room prior to the transfer | Fails to check patient once they are in bed |
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| PM2 | Constructs a clear operation note | Makes a legibly written or clearly dictated note | Writes illegibly, mumbles on Dictaphone | Fails to write or dictate anything at all |
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| PM3 | Records clear and appropriate post operative instructions | Writes in clear text a list of post-operative instructions in the notes | Gives verbal instructions to a pass nurse | Fails to write anything in the notes at all |
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| PM4 | Deals with specimens. Labels and orientates specimens appropriately | Personally arranges specimens for pathologist | Delegates checking labels to junior  | Does not label specimens |
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