Brain Tumours

Disclaimer

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Red Flags

- Suspected raised intracranial pressure
- Suspect high-grade glioma

Background – About Brain Tumours

- Brain tumours may be primary or secondary (metastatic), benign, or malignant.
- Secondary brain tumours commonly metastasise from skin, lung, breast, kidney, and bowel.
- The WHO classification of brain tumours is based on:
  - cell of origin and its specific genotype. Currently there are more than 120 types.
  - cell behaviour from Grade I (least malignant) to Grade IV (most malignant).
- High grade gliomas (glioblastoma multiforme) are a common primary brain tumour and have an aggressive course if left untreated.
  - Treatment options include surgery, chemotherapy, and radiation, and may include experimental clinical trials
  - Management requires a comprehensive team of care givers to support the patient and immediate carers and provide information to help make treatment choices.
  - With improvements in treatment, some people may become long term survivors of this disease.
- Other primary brain tumours include:
  - Medulloblastoma – high grade tumour that originates in the cerebellum.
  - Meningioma – benign tumour of the meninges.
  - Pituitary tumour – adenomas are the most common intracranial neoplasm.
  - Schwannoma – tumour that originates from Schwann cells.

Assessment

1. Take a history – ask specifically about:
   - **symptoms suggesting brain tumour.**
     - Headache – persistent, progressive, often present on waking and associated with vomiting
     - Seizures – occur in 30% of patients with brain tumours and include:
       - generalised tonic clinic seizures
       - partial seizures – Can be either simple, (patient is awake and aware) or complex (patient has impaired awareness) e.g.:
         - Simple parietal sensory seizure – change in sensation, vision, smell and/or hearing without losing consciousness
         - Simple partial motor seizure – repetitive, unintentional movements, such as twitching, jerks, spasms
         - Complex partial seizures, arising from temporal lobe – visual or auditory hallucinations, awareness of abnormal taste, feelings of fear, déjà vu, and maybe associated with repetitive, unintentional movements, such as twitching
       - Blackouts or other alterations in conscious state
       - Poor coordination
       - Visual deterioration
       - Progressive weakness
       - Change in behaviour
       - Change in memory
       - Confusion, drowsiness
• Speech disturbance
• Other unexplained neurological symptoms

• **risk factors for high grade glioma.** (Note the presence of multiple signs and symptoms, particularly in combination with other underlying risk factors, indicates an increased risk of high-grade glioma.)

**Risk factors for high grade glioma**
- Age (over 40 years)
- Gender – 1.5 times more common in males
- Race – Twice as common in people of Caucasian descent
- Exposure to ionising radiation, vinyl chloride, pesticides, petroleum refining, synthetic rubber manufacturing
- Certain hereditary syndromes such as:
  - neurofibromatosis type 1 and 2
  - Li Fraumeni syndrome
  - Turcot syndrome
  - multiple endocrine neoplasia type 1
  - Lynch syndrome
  - Gorlin-Gotz syndrome
  - tuberous sclerosis complex
  - Cowden disease.

There is a common myth around mobile phone usage increasing risk of cancer, in particular glioma. Current research indicates that there are no established health effects from the mobile phone usage (ARPANSA 2016).

• current or previous history of cancer, particularly skin, lung, breast, kidney, bowel.
• any other symptoms, e.g. respiratory, gastrointestinal, urological, general.
• any recent investigations.

2. Perform examination:
- Vital signs including blood pressure
- General examination, particularly for adenopathy, organomegaly
- Perform a **brief neurological examination**.

**Brief neurological examination**
- Designed by neurologists to exclude sinister causes of headache including brain tumour and haemorrhage.
- Suitable for patients whose history suggests migraine or tension-type headaches. Full neurological exam is recommended for all other patients.

<table>
<thead>
<tr>
<th>Examination</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Romberg’s test</td>
<td>Test is positive if the patient sways or falls with eyes closed and indicates proprioceptive dysfunction. Patients with cerebellar lesions will fall or sway with eyes open or closed.</td>
</tr>
<tr>
<td>2 Tandem gait test</td>
<td>Heel-to-toe walking. Tests balance but is non-specific. Difficulty with this task can be due to weakness, poor position sense, vertigo, leg tremors, or a cerebellar lesion. Elderly patients typically have difficulty with tandem gait.</td>
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<td>3 Walking on heels</td>
<td>Tests pyramidal tract.</td>
</tr>
</tbody>
</table>
4 Drift of outstretched arms Tests pyramidal tract.
5 Finger-nose test Tests coordination.
6 Visual acuity and visual fields to confrontation
7 Face movements and symmetry
8 Blood pressure and temperature
9 Language assessment An assessment of language observed during history taking (problems with comprehension and word finding difficulty and slurred speech).

- Consider examination of:
  **Cranial nerves**

<table>
<thead>
<tr>
<th>Nerve and sensory function</th>
<th>Motor function</th>
<th>Reflex</th>
<th>Assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olfactory - Smell</td>
<td></td>
<td></td>
<td>Smell in each nostril</td>
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<tr>
<td>Optic – Vision</td>
<td></td>
<td>• Pupillary light reflex (afferent limb)</td>
<td>Visual acuity (Snellen chart)</td>
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<td></td>
<td></td>
<td>• Accommodation reflex (afferent limb)</td>
<td>Visual fields (confrontation)</td>
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<tr>
<td></td>
<td>Eye movements (medial rectus, superior rectus, inferior rectus, and inferior oblique)</td>
<td></td>
<td>Pupils (pen torch)</td>
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<tr>
<td></td>
<td>• Eyelid movement</td>
<td></td>
<td>Accommodation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pupillary light reflex (efferent limb)</td>
<td>Eye movements (horizontal abduction and movement up and down)</td>
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<tr>
<td></td>
<td></td>
<td>• Accommodation reflex (efferent limb)</td>
<td>Eyelids (check for ptosis)</td>
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<td></td>
<td></td>
<td>Pupils</td>
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<td></td>
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<td>Accommodation</td>
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<tr>
<td>Oculomotor</td>
<td>Eye movements (superior oblique)</td>
<td>Eye movements (down and in)</td>
<td></td>
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<tr>
<td>Trigeminal – Facial sensation</td>
<td>Jaw movements</td>
<td>• Corneal reflex (afferent limb)</td>
<td>Facial sensation (noting distribution of V1, V2, and V3)</td>
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<tr>
<td></td>
<td></td>
<td>• Jaw jerk</td>
<td>Sensation of anterio2/3rds of tongue</td>
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<td></td>
<td></td>
<td></td>
<td>Jaw opening and closure (masseter, temporalis, and pterygoid muscles)</td>
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<tr>
<td>Pathway</td>
<td>Test</td>
<td>Result</td>
<td></td>
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<tr>
<td>Abducens</td>
<td>Eye movements (lateral rectus)</td>
<td>Eye movement (horizontal abduction)</td>
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<td></td>
<td>Corneal reflex (with cotton wool)</td>
<td>Jaw jerk</td>
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<td></td>
<td>Jaw jerk</td>
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<td>J aw jerk</td>
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<tr>
<td>Facial</td>
<td>Facial muscles</td>
<td>Corneal reflex (efferent limb)</td>
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<tr>
<td></td>
<td>Test facial muscles against resistance e.g., raise eyebrows, close eyes</td>
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<td></td>
<td>An upper motor neuron lesion will result in contralateral paralysis of the lower face only</td>
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<tr>
<td></td>
<td>A lower motor neuron lesion will result in ipsilateral paralysis of the upper and lower face</td>
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<tr>
<td>Vestibulocochlear</td>
<td>Vestibulocochlear – Hearing and balance</td>
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<td></td>
<td>Rinne test – normal or possible sensorineural deafness if air conduction is greater than bone conduction. Suspect conductive deafness if bone conduction greater than air conduction. Weber test – sound lateralises to abnormal side in conductive deafness, and normal side in sensorineural deafness.</td>
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<td>Glossopharyngeal</td>
<td>Glossopharyngeal – Posterior 1/3rd of tongue</td>
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<td></td>
<td>Gag reflex (afferent limb)</td>
<td>Gently touch back of throat with tongue depressor, warning patient prior to doing so</td>
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<tr>
<td>Vagus</td>
<td>Vagus</td>
<td>Gag reflex (efferent limb)</td>
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<td></td>
<td>Palatal movement</td>
<td>Ask patient to say “Ah” and watch for symmetrical movement</td>
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<td></td>
<td>Vocal cord movement</td>
<td>Ask patient to repeat a sentence e.g., “West Register Street”</td>
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<tr>
<td>Accessory</td>
<td>Accessory</td>
<td>Test shoulder elevation and head rotation against resistance</td>
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<td>Accessory</td>
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</table>
Hypoglossal

| Tongue protrusion and movement | • Observe tongue for any asymmetry, atrophy, or fasciculations  
• Test tongue power against cheeks |

- **Upper and lower limbs**
  Assess for:
  - Symmetry, muscle wasting, fasciculations, clonus
  - Tone
  - Power:
    - 0 = no movement
    - 1 = flicker of contraction
    - 2 = movement with gravity eliminated
    - 3 = movement against gravity
    - 4 = active movement against gravity and resistance
    - 5 = normal power
  - Reflexes:
    - Biceps jerk (C5, C6)
    - Triceps jerk (C7, C8)
    - Brachioradialis jerk (C5, C6)
    - Finger jerk (C8)
    - Knee jerk (L3, L4)
    - Ankle jerk (S1, S2)
    - Plantar reflex (L5, S1, S2)
  - Sensation:
    - Pinprick
    - Light tough
    - Vibration (128Hz tuning fork)
    - Proprioception
  - Coordination:
    - Finger-nose test
    - Heel-shin test
- Consider Mini-Mental State Examination – available in most practice software.

3. Arrange **urgent neurosurgery assessment** prior to investigations if suspect:
   - raised intracranial pressure. Progressive, severe morning headache, with vomiting, drowsiness, or deterioration in level of consciousness.
   - high-grade glioma suspected based on the presence of multiple signs and symptoms, particularly in combination with other underlying risk factors.

4. Consider arranging investigations:
   - MRI brain – GP bulk-billed for the following indications:
     - Unexplained seizures
     - Unexplained chronic headache with suspected intracranial pathology
   - CT scan – generally the modality of choice for assessment of acute intracranial conditions however, soft tissue resolution is inferior to MRI.
   - Routine blood tests – FBE, electrolytes, urea, and creatinine, LFTs, CRP, ESR
   - Consider CT chest, abdomen, and pelvis in patients with previous or current known malignancy.
Management

If patient identifies as Aboriginal or Torres Strait Islander, understand their specific cultural and spiritual needs when discussing and delivering treatment options, including eligibility for Integrated Team Care (ITC) services.

**Cultural and spiritual considerations for Aboriginal and Torres Strait Islander People**
- Offer referral to culturally appropriate social and emotional wellbeing services.
- Consider including an expert in the multidisciplinary team, to provide culturally appropriate care to Aboriginal and Torres Strait Islander people.
- Provide culturally appropriate information or resources about the signs and symptoms of recurrent disease, secondary prevention, and healthy living.

**Prior to diagnosis**

1. Arrange immediate neurosurgery assessment if:
   - features of raised intracranial pressure.
   - assessment suggests high-grade glioma. Optimal Cancer Pathways suggest review within 24 hours of onset of symptoms

2. Refer all patients with newly diagnosed symptomatic intracranial tumours for urgent neurosurgery assessment.
   - The Alfred – [click here]
   - Monash Hospital - [click here]
   - Peninsula Health – [click here]

3. Provide information to patient and carers
   - Treatment will be individualised depending on the type of tumour and patient’s general health
   - Until formerly assessed avoid driving or using heavy machinery
   - Use simple analgesia for headaches and other symptoms

4. If incidental asymptomatic benign intracranial tumour with no neurological deficit or mass effect on imaging, e.g., meningiomas and non-functioning pituitary adenomas, request routine neurosurgery assessment.
   - The Alfred – [click here]
   - Monash Hospital - [click here]
   - Peninsula Health – [click here]

**Support following diagnosis**

1. Ensure clear communication with neurosurgical team lead clinician. Discuss:
   - type and stage of brain tumour.
   - treatment objectives.

   **Treatment objectives**
   - Based on type, size and stage of tumour
   - Patient’s general health and wishes
   - For patients with high-grade glioma, treatment is limited to:
     - longer term survival without expectation of cure
     - maintenance of quality of life
     - symptom palliation.
2. For high-grade glioma management or other Grade III to IV tumours:
   - ensure patient and family is informed and involved in management decisions.
   - consider the supportive care domains in consultation with neurosurgical team.

**Supportive care domains**
Supportive care in cancer refers to the following five domains:
- Physical domain, which includes a wide range of physical symptoms that may be acute, relatively short-lived or ongoing, requiring continuing interventions or rehabilitation.
- Psychological domain, which includes a range of issues related to the patient’s mental health wellbeing and personal relationships.
- Social domain, which includes a range of social and practical issues that will affect the patient, carer and family such as the need for emotional support, maintaining social networks and financial concerns.
- Information domain, which includes access to information about cancer and its treatment, recovery and survivorship support services and the health system overall.
- Spiritual domain, which focuses on the patient’s changing sense of self and challenges to their underlying beliefs and existential concerns.

Source: Cancer Council – Optimal Care Pathway for People With High-Grade Glioma Cancer: Appendix: Supportive Care

- provide support and counselling using the following resources:
  - Cancer Council including Cancer Connect helpline: 13 11 20
  - Brain Tumour Alliance Australia – has an extensive list of resources

- Involve Palliative Care Australia early to improve quality of life. See related pathways:
  - Advanced Care Planning (ACP)
  - GP Palliative Care Resources
  - New Palliative Care Patient

### Referral
- Arrange immediate neurosurgery assessment if:
  - features of raised intracranial pressure.
  - assessment suggests high grade glioma.
- If newly diagnosed symptomatic intracranial tumours, arrange urgent neurosurgery assessment.
  - The Alfred – [click here](#)
  - Monash Hospital - [click here](#)
  - Peninsula Health – [click here](#)
- If incidental asymptomatic benign intracranial tumour with no neurological deficit or mass effect on imaging, arrange routine neurosurgery assessment.
- If Aboriginal or Torres Strait Islander patient, offer referral to specific Aboriginal and Torres Strait Islander services. For all referrals, to both mainstream and Indigenous services, ensure Indigenous status is clearly marked on the referral.
Referral Options for Aboriginal and Torres Strait Islander people
- For hospital referrals, consider engaging support from the Aboriginal Hospital Liaison Officers.
- For community referrals, consider referral to an Aboriginal Community Controlled Health service.
- For care coordination, support and advocacy throughout treatment, consider referral to Integrated Team Care Program.

Information

For health professionals

Further information
- Brain Tumour Alliance Australia
- Cancer Council Australia – Optimal Care Pathway for People With High-Grade Glioma Cancer

For patients

- Brain Tumour Alliance Australia [Has a list of useful resources to support patients with brain cancer and their carers. Some of the resources are available in multiple languages. BTAA also maintains a list of peer support groups.]
- Cancer Council phone 13-11-20 [A confidential telephone support service available to anyone affected by cancer.]
- Canteen [Helps adolescents, young adults and parents to cope with cancer in their family. Canteen offers individual support services, peer support services and a youth cancer service, as well as books, resources and useful links.]

References

Select bibliography
- Optimal cancer care pathway for people with high-grade glioma. NSW: Cancer Council; 2016.

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