

Disease specific information required:

Head Injury		
History	Neurological state at scene and now Witness history – LOC, seizures, movements Mechanism – MVA, MBA, push bike, ped vs car, fall Timing – of injury, of retrieval, of scan, of deterioration Contributing factors – EtOH, drugs, comorbidities Associated injuries – including chest, abdomen, large long bones, spine esp neck Emergency management – intubation, chest drains, laparotomy, traction PMHx – coagulopathies, previous head injuries or operations Meds – antiplatelets, anticoagulants	
Examination	GCS - EVM Cranial nerve examination Limb examination Cranial wounds – open /closed Other injuries (& their management if decided)	* Fractures of the orbital rim can cause ophthalmoplegia * Temporal bone fracture can be associated with CN VII and/or VIII injuries * Occipital fractures can be associated with CN XII injury
Imaging	CT – fractures, contusions, EDH, SDH, ICH, IVH - Most injuries require a 24 hr progress CTB to monitor for any evolution of injury CT c-spine	* CTA may be required if the pattern of blood is suspicious for other causes (including an aneurysm in SAH) or were a BOS # can be associated with carotid or vertebral artery injury * CTV may be required if jugular vein injury needs to be ruled out due to BOS #
Labs	ALL: FBC – Hb & platelets U&E – Na Coags G&H (severe cases) LFTs – if EtOH or liver disease suspected	

Cranial Tumours		
History	Symptoms – timing, severity PMHx – esp other malignancy - Including treatments Comorbidities - that can predispose to malignancy Meds – antiplatelets & anticoagulants	* Headache, nausea, vomiting, blurred vision, seizures, weakness, confusion * May require history from family/friends also * Seizure meds or hormone replacement medications can also be important in certain tumours
Examination	GCS – EVM Cranial nerve examination Limb examination Lobe examination - frontal: confusion, behaviour changes, weakness, speech, - parietal: Gerstman syndrome, sensory changes - temporal: memory, speech - occipital: visual fields - cerebellar: balance, past pointing	
Imaging	CTB + contrast MRI CT C/A/P – Ix for primary malignancy CXR – Ix for primary disease	* If MRI not yet completed, important to ensure there is no contraindication (implants) or will sedation be required
Labs	FBCs – Hb & Plts U&E – Na Coags LFTs – derangements due to liver disease or liver involvement	
Other	Med Onc or Rad Onc opinions Patient / family wishes	

<u>Cranial Infections</u>		
History	Symptoms – headaches, fevers, lethargy, seizures, confusion Associated symptoms that may suggest source – ears, throat, sinuses, IE PMHx – immunocompromise, organ disease, Travel history Past surgical history – esp cranial and spinal, other implants Meds – antibiotics, antiplatelets, anticoagulants	* Important to ask about other symptoms that may indicate the source of the infection
Examination	GCS – EVM Cranial nerve examination Limb examination Focused examination for other sources of infection	
Imaging	CTB + contrast MRI + contrast Other imaging as dictated by source	
Labs	FBC – Hb, WCC, Plts U&E - Na CRP Cultures LFTs – if liver disease or EtOH	
Other	Infectious diseases review	

Intracranial Haemorrhage

Extradural haematoma (EDH), Subdural haematoma (SDH), Interventricular haemorrhage (IVH),
Subarachnoid haemorrhage (SAH), Intraparenchymal haemorrhage

History	<p>Mechanism – trauma, incidental, sudden onset Symptoms – headache, collapse, weakness, nausea, vomiting, speech disturbance, confusion Timing of symptoms Comorbidities – HTN, other vascular issues, diabetes, cirrhosis, CRF, PMHx – AAA, other aneurysms, cranial operations, malignancy history Meds – antiplatelets, anticoagulants Previous functional status</p>	<p>* Sudden onset without trauma is highly suspicious for vascular cause and should prompt CTA * Sudden onset headache with meningitic symptoms is SAH until proven otherwise * Some malignancy has a high bleeding tendency – RCC, melanoma – if history of these, haemorrhage into tumour should be considered</p>
Examination	<p>GCS – EVM Cranial nerves Limb Lobes - frontal: confusion, behaviour changes, weakness, speech, - parietal: Gerstman syndrome, sensory changes - temporal: memory, speech - occipital: visual fields - cerebellar: balance, past pointing</p>	
Imaging	<p>CTB + CTA if suspicious for vascular cause</p>	<p>* In trauma cases, important to note any fractures also * In trauma, consider neck injuries too * It can be difficult to distinguish haemorrhagic stroke from other ICHs and both neurology and neurosurgery may be required to be involved</p>
Labs	<p>FBC – Hb, WCC & Plts U&E – Na Coags LFTs – if liver disease or EtOH present</p>	
Other	<p>Patient / family wishes AHDs</p>	

Vascular Neurosurgery

Aneurysms, arteriovenous malformations (AVMs), dural AV fistulas (dAVF)

History	Incidental, symptomatic or ruptured Symptoms – headaches, collapse, seizures, weakness, confusion, nausea, CN signs Timing of onset of symptoms PMHx – cranial operations, cranial trauma, HTN Comorbidities – other vascular issues, genetic conditions Meds – antiplatelets or anticoagulants Social – smoking Family – hx of aneurysms	* Symptomatic can be due to rupture (usually rapid onset) or mass effect
Examination	GCS – EVM Cranial nerve examination Limb examination	* PCOM aneurysms can present with a CN III palsy
Imaging	CTB – pattern of blood if present CTA COW – for aneurysms and AVMs CTV – if venous fistula present	
Labs	FBC – Hb, Plts U&E – Na Coags LFTs – in liver disease or EtOH	

Hydrocephalus		
Normal pressure hydrocephalus (NPH), obstructive hydrocephalus, blocked shunts		
History	Symptoms – confusion, drowsiness, gait disturbance, weakness, ophthalmoplegia, Timing of symptoms Comorbidities – infections, malignancy PMHx – SAH, cerebral infections, head trauma, cranial malignancy If shunt present – type of shunt, last revision, original indication, setting, Meds – antiplatelets, anticoagulants	* NPH – triad of symptoms is usually memory decline, gait disturbance, urinary incontinence * Important to rule out primary causes of hydrocephalus – past SAH, infections, trauma, operations, tumours * Obstructive hydrocephalus from a mass lesion needs malignancy workup
Examination	GCS – EVM Cranial nerve examination - including fundoscopy for papilloedema Limb examination MMSE – in suspected NPH	*
Imaging	CTB +/- contrast if malignancy suspected MRI – including CSF flow studies	* Shunt series xrays if disconnected/blocked shunt suspected * Nuclear medicine shunt study can be done in consultation with neurosurgical unit for checking of patency of shunt system
Labs	FBC – Hb, Plts U&E – Na Coags LFTs – in liver disease or EtOH	CSF from LP may be performed in certain conditions – it is important to test it for infection, malignancy and protein content
Other	Tap test – organised with Neurology department (for new Dx of NPH)	

Spinal Injury		
History	Mechanism – MVA, MBA, push bike, fall Timing Symptoms – pain, weakness, sensory changes, urinary retention, bowel incontinence Other injuries – chest, abdominal, pelvis, head Comorbidities – osteoporosis, RF, malignancy	
Examination	Limb examination - tone - power in each myotome in each limb - reflexes (deep tendon, Hoffman, Babinski) - sensory changes PR – must be done Other: pulses, trophic skin changes, overt local injuries	Other examination components are to rule out other local causes of limb symptoms (vascular, orthopaedic)
Imaging	Xray – screening tool only CT – identifies most bone injuries MRI – determines integrity of ligaments or subtle fractures	* CTA neck may be indicated in some cervical fractures to look for vertebral artery injury * Some fractures can be associated with other injuries – L1 with duodenal perforation, low L-spine TP #s with ureter injury
Labs	FBC – Hb, Plts Coags LFTs – in liver disease or EtOH	* UA if ureteral injury suspected
Other	Remain on spinal precautions until cleared by the trauma / NSx /Ortho team	

<u>Cord Compression / Cauda Equina</u>		
History	Symptoms – weakness, pain, sensory changes, hx of falls, incontinence Timing of symptoms PMHx – malignancy, osteoporosis, RF, previous spinal operations Meds - antiplatelets, anticoagulants	
Examination	Limb examination <ul style="list-style-type: none"> - Tone in all limbs - Power in all myotomes in all limbs - Reflexes - sensation PR	
Imaging	CT spine MRI spine	* In malignancy scenarios, whole spine imaging is required for evaluation
Labs	FBC – Hb, Plts Coags LFTs – in liver disease or EtOH	
Other	Med Onc and Rad Onc opinions in malignancy cases	

<u>Spinal Tumours</u>		
History	Symptoms <ul style="list-style-type: none"> - including systems review for primary malignancy symptoms Timing of symptoms PMHx - malignancy history, liver disease, renal disease, osteoporosis, Meds – antiplatelets, anticoagulants	
Examination	GCS Cranial nerve Limb examination (as for cord compression) PR Systems review for other malignancy	
Imaging	CT spine – whole spine MRI spine – whole spine +/- CT C/A/P	* Whole spine imaging is required to determine if single or multiple lesions exist
Labs	FBC – Hb, Plts U&E –Ca, PO4 Coags LFTs – in liver disease or EtOH	
Other	Rad Onc and Med Onc opinions – esp if spinal lesion is a secondary metastasis	

Spinal Infections		
History	Symptoms - infective sources (chest, sinuses, ear, IE) Timing of symptoms PMHx – esp infective issues, other implants, immunocompromise Travel history Meds – antiplatelets, anticoagulants	
Examination	GCS Cranial nerves Limb examination - including PR Other systems of infection as directed by history	* CSF can be a route of spread, so it is important to consider spread to intracranial compartment and so examine this also
Imaging	CT spine + contrast MRI spine + contrast Other imaging as dictated by other infective symptoms - CTB, CT sinuses, MRI brain - Echo - CXR / Chest CT	* Any suggestion of cranial involvement requires brain imaging with contrast * Ear or sinus symptoms may require dedicated imaging of these areas * Any suggestion of TB requires CXR or CT chest
Labs	FBC – Hb, WCC, Plts Coags LFTs – in liver disease or EtOH CRP Any cultures	
Other	Infectious diseases consult	

Degenerative Spine Disease		
History	Symptoms Timing of symptoms Functional decline Management so far – meds, physio, injections PSHx Comorbidities – diabetes, liver disease, renal failure, osteoporosis, Meds – analgesia, antiplatelets, anticoagulants	
Examination	Limb examination - Including PR Gait	
Imaging	CT spine MRI spine	
Labs	FBC – Hb, Plts Coags LFTs – in liver disease or EtOH	
Other	Patient expectations	

<u>Carpal Tunnel</u>		
History	Symptoms Timing of symptoms Restrictions due to symptoms Trialled treatments – splinting, medications Comorbidities Meds – antiplatelets, anticoagulants	* Important to ask about neck pain and symptoms to rule out central cause (ie spinal cause)
Examination	Limb examination Carpal tunnel examination – Tinel and Phalen’s signs	
Imaging	MRI cervical spine – to exclude central cause, esp if concurrent neck pain Nerve conduction studies	
Labs	FBC – Hb, Plts Coags LFTs – in liver disease or EtOH	

<u>Ulnar Neuropathy</u>		
History	Symptoms Timing of symptoms Restrictions due to symptoms Trialled treatments – splinting, medications Comorbidities Meds – antiplatelets, anticoagulants	* Important to ask about neck pain and symptoms to rule out central cause (ie spinal cause)
Examination	Limb examination Ulnar nerve examination – Tinel and Phalen’s signs	
Imaging	MRI cervical spine – to exclude central cause, esp if concurrent neck pain Nerve conduction studies	
Labs	FBC – Hb, Plts Coags LFTs – in liver disease or EtOH	

<u>Peripheral Nerve Tumours</u>		
History	Symptoms PMHx – other tumours, genetic conditions, other NSx issues Fam Hx – genetic conditions Meds – antiplatelets, anticoagulants	
Examination	Cranial nerves Limb examination	
Imaging	Depends on location of mass – usually CT and MRI	In some instances screening imaging may be required to detect other lesions
Labs	FBC – Hb, Plts Coags LFTs – in liver disease or EtOH	

Muscle and Nerve Biopsies

- These can be arranged as required.
- Patients need to be able to have a general anaesthetic (biopsies cannot be done under local anaesthetic due to its effects on the specimen).
- Patients must be able to be off all antiplatelets and anticoagulants and have no coagulopathies.
- A completed pathology form and arranged ice box and transport to RPA should also be arranged for the day of surgery.
- If specific muscles or nerves, or sides, are recommended this should be communicated to the NSx team.

Other Conditions:

- Trigeminal neuralgia – procedures can be done for the pain relief of trigeminal neuralgia. This is usually after a suitable trial of medications as advised by the Neurologist.
- Interventional Neuroradiology offers cerebral angiograms and endovascular coiling, stenting and clot retrieval services through the neurosurgical unit.
 - o For angiograms, coiling or stenting the case should be discussed with the on call neurosurgical registrar (similar to incidental aneurysms)
 - o For clot retrievals – this is a service offered in combination with the neurology department. The on call Stroke reg should be the first consult made – they inform Neurosurgery of appropriate cases.
- Brain biopsy may be offered in certain scenarios. Details about the case and what is to be tested for will be required.
 - o Similar details as those of cerebral tumours