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|----------|--|
| Syllabus | NA_IK_13, NA_IK_18, GU_IK_03, OR_IK_02, PB_IK_25 |
| Topic    | Acute spinal cord injury                         |

a)

List 2 sensory, motor and autonomic changes that occur immediately following transection of the spinal cord at the fourth thoracic vertebra? (6 marks)

| Changes          |                  |
|------------------|------------------|
| <b>Sensory</b>   | 1. ....<br>..... |
|                  | 2. ....<br>..... |
| <b>Motor</b>     | 1. ....<br>..... |
|                  | 2. ....<br>..... |
| <b>Autonomic</b> | 1. ....<br>..... |
|                  | 2. ....<br>..... |

**b)**

List 2 cardiovascular, respiratory and gastrointestinal problems that may develop after three months following this type of injury? (6 marks)

|                         | Changes          |
|-------------------------|------------------|
| <b>Cardiovascular</b>   | 1. ....<br>..... |
|                         | 2. ....<br>..... |
| <b>Respiratory</b>      | 1. ....<br>..... |
|                         | 2. ....<br>..... |
| <b>Gastrointestinal</b> | 1. ....<br>..... |
|                         | 2. ....<br>..... |

**c)**

List 2 symptoms of autonomic dysreflexia (2 marks)

1. ....
2. ....

**d)**

List 4 advantages of regional anaesthesia for lower limb surgery in this patient (4 marks)

1. ....
2. ....
3. ....
4. ....

**e)**

When, and why, may suxamethonium be contraindicated in this patient? (2 marks)

When: .....

Why: .....

|          |  |
|----------|--|
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| Q  | Answer   | Mark                         | Guidance   |
|----|--|------------------------------|--|
| a) | <p><u>Sensory</u></p> <ul style="list-style-type: none"> <li>• Complete sensory loss below level of injury</li> <li>• A variable extent above level of transection due to secondary injury; haemorrhage, oedema, ischaemia</li> </ul> <p><u>Motor</u></p> <ul style="list-style-type: none"> <li>• Spinal shock</li> <li>• Flaccid paralysis</li> <li>• Reflexes are obliterated as these depend on tonic descending facilitation</li> </ul> <p><u>Autonomic</u></p> <ul style="list-style-type: none"> <li>• Neurogenic shock</li> <li>• Loss of sympathetic function with unopposed parasympathetic activity. Results in hypotension, bradycardia and other arrhythmias</li> <li>• Loss of other autonomic reflexes (voiding, bowel emptying, coital)</li> </ul> | 2 marks per section (Max. 6) |  |
| b) | <p><u>Cardiovascular</u></p> <ul style="list-style-type: none"> <li>• Autonomic dysreflexia</li> <li>• Risk of ischaemic heart disease due to physical activity and development of diabetes</li> <li>• Difficult intravenous access due to fragile skin, reduced surface blood flow</li> </ul> <p><u>Respiratory</u></p> <ul style="list-style-type: none"> <li>• Loss of innervations of intercostal muscles leads to failure of expansion of ribcage and reduced tidal volume</li> <li>• Breathing worse in sitting position. Abdominal contents pull down on diaphragm, expanding expiratory intrathoracic volume, so reducing volume for expansion in inspiration. High proportion of minute ventilation therefore</li> </ul>                                  | 2 marks per section (Max. 6) | Neurogenic shock may last 24 hours to several weeks. Vasodilatation and bradycardia resulting in hypotension. Sensitive to fluid depletion especially with positive pressure ventilation |

|    |   |       |  |
|----|---|-------|--|
|    | <p>spent on ventilating dead space, resulting in V/Q mismatch and atelectasis</p> <ul style="list-style-type: none"> <li>• Difficulty clearing secretion: inefficient coughing due to loss of abdominal wall tone</li> </ul> <p><u>Gastrointestinal</u></p> <ul style="list-style-type: none"> <li>• Reduced gastric motility; delayed gastric emptying (aspiration risk), paralytic ileus, constipation, pseudo-obstruction</li> <li>• Increased risk of gallstones and their complications</li> <li>• Prone to stress ulceration due to unopposed vagal activity</li> </ul>   |       |  |
| c) | <ul style="list-style-type: none"> <li>• Headache</li> <li>• Flushing</li> <li>• Nasal congestion</li> </ul>  | Any 2 | <p><i>Signs include:</i></p> <p><i>Uncontrolled hypertension</i></p> <p><i>Seizures</i></p> <p><i>Retinal Haemorrhages</i></p> <p><i>Stroke</i></p> <p><i>Coma</i></p> <p><i>Death</i></p> |
| d) | <ul style="list-style-type: none"> <li>• Avoids autonomic dysreflexia</li> <li>• Avoids need for intubation; patient may have previously had tracheostomy with its associated complications e.g. tracheal stenosis)</li> <li>• Avoids deterioration in lung function associated with general anaesthesia therefore reduces risk of postoperative respiratory complications</li> <li>• Avoids opioid use with associated respiratory depression</li> <li>• Reduces risk of aspiration associated with delayed gastric emptying</li> <li>• Avoidance of unopposed parasympathetic response to airway instrumentation (bradycardia, cardiac arrest)</li> </ul> | Any 4 |  |
| e) | <ul style="list-style-type: none"> <li>• Upregulation of nicotinic acetylcholine receptor in extrajunctional sites</li> <li>• Results in massive potassium release with suxamethonium use</li> <li>• Effect seen between 72 hours after injury and six months</li> </ul>  | Any 2 |  |

References:

1) Bonner S, Smith C. Initial management of acute spinal cord injury. CEACCP (2013) 13(6)224–231 <https://academic.oup.com/bjaed/article/13/6/224/246947>

2) Petsas A, Drake J. Perioperative management for patients with a chronic spinal cord injury. BJA Education (2015) 15(3)123–130  
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