

Medical Management of the Surgical Patient with Neurological Disorder

Epilepsy

Epilepsy is a group of disorders characterized by recurrent changes in neurological function (Seizures) and accompanied by altered consciousness or involuntary movements due to abnormal electrical activity in the brain (Little *et.al.*, 2012).

Types of epilepsy (Fitzpatrick *et.al.*, 2008):

1. Generalized seizures: The abnormal electrical activities involve most of the brain. This can include:
 - a. Tonic-clonic: involve loss of consciousness and convulsions.
 - b. Absence seizures: involves a short period (<30 seconds) of unresponsiveness.
2. Partial seizures: The abnormal electrical activities are localized to part of the brain. This can include:
 - a. Simple: Involves specific area and the consciousness is preserved.
 - b. Complex: Manifested by loss of consciousness.
3. Others

Only the generalized tonic-clonic will be discussed, as it's the most severe type of these groups (Little *et.al.*, 2012).

Status Epilepticus: It's a serious, life-threatening complication of epilepsy (especially tonic-clonic), characterized by occurrence of repeated seizures over a short duration without recovery. It can be caused by sudden discontinuation of anti-epileptic medication, infection, trauma and other causes. Status Epilepticus can result in respiratory compromise with resultant hypoxia (manifested by cyanosis) and acidosis which can lead to brain damage or even death (Little *et.al.*, 2012).

General sign and symptom of Epilepsy (Little *et.al.*, 2012):

The clinical manifestations of generalized tonic-clonic epilepsy include the following phases:

- A. Aura: This involves a short and transient sensory and emotional disturbance (e.g. visual disturbance, irritability) that occurs in some patients prior to the convulsions.
- B. Epileptic cry: A sudden shout accompanied by loss of consciousness.
- C. Tonic Phase: Characterized by generalized muscle spasm, pupil dilatation and eye rolling upward. Respiration might cease due to respiratory muscle spasm.
- D. Clonic Phase: This consists of forcible close of the jaws and uncontrolled movements of limbs and head. In addition, Urinary incontinence might occur.

Finally, the seizure stops and the muscles relaxes, this usually lasts no more than 90 seconds with gradual gaining of consciousness. However, the patient might sleep for considerable period to fully return to their physical and cognitive abilities.

Oral manifestation of epilepsy (Fitzpatrick *et.al.*, 2008):

1. Dental injuries due to trauma at time of seizure (Fig.1).
2. Soft tissue lacerations, including bite injuries to the tongue (Fig.1).
3. Gingival hyperplasia (Fig.1).
4. Oral ulceration and/or glossitis.
5. Gingival bleeding might occur with some patient.
6. TMJ dislocation might occur which require repositioning.



Figure 1 (A) Fractured upper central incisors and lacerated lower lip, (B) Phenytoin-induced gingival hyperplasia (Little *et.al.*, 2012)

Dental management of epileptic patients:

In the first appointment, history should be taken to identify type of seizure, their frequency, medication taken and degree of seizure control. Poor and frequent seizures require consultation from supervising physician, as the latter might advise additional anticonvulsant or sedative medication to be taken prior to any dental intervention. On the other hand, well controlled patient have no risk for having any dental treatment (Little *et.al.*, 2012).

Local anaesthesia (E.g. Lidocaine with epinephrine) is considered safe to be used. Intravenous sedation is helpful to minimize the risk of seizures during dental procedures and it can be used for management of status epilepticus (Fitzpatrick *et.al.*, 2008).

Procedures are best scheduled just after medication intake, removable dentures should be removed, Ligated mouth probe should be placed and warn the patient to mention if any signs of the aura are sensed (Little *et.al.*, 2012).

Drug interaction between antiepileptic medication and drugs used in dentistry (Aragon and Burneo, 2007) (Fitzpatrick *et.al.*, 2008):

1. Antifungals:

- Antifungals (e.g. fluconazole, miconazole) increase plasma level of phenytoin. Therefore, their coadministration requires dose adjustment of the latter.

2. Antibacterial:

- Metronidazole inhibits metabolism of phenytoin increasing its plasma level.
- Erythromycin inhibit metabolism of valproate and also increases its plasma level.

3. Analgesics:

- NSAIDs increase plasma level of phenytoin and valproate. Aspirin also potentiate platelet dysfunction caused by valproate, which in turn increase bleeding tendency and their concomitant intake should be avoided.
- Phenytoin accelerates metabolism of paracetamol giving a low risk of hepatotoxicity.

Emergency management of seizures in dental office (Aragon and Burneo, 2007):

During dental procedure if seizure developed while the patient in the dental chair:

- Remove all instruments away from the patient
- Adjust the dental chair to supported supine position with the lowest height (i.e. closest to floor).
- Don't restrain the patient.
- Don't try to insert mouth probe into the oral cavity, as this might introduce damage to patient's teeth or soft tissues and the operator fingers. It should be used in the beginning of the procedure.

Seizure usually terminates after few minutes (<5 minutes), after that the patient fall into sleep. During this phase:

- Administrate oxygen at 6-8 L/Minute
- Maintain the airway, provide suction or turn the patient on his/her side to prevent aspiration of secretions.
- Measure glucose level and administrate if the patient is hypoglycaemic.
- No other treatment should be provided, but examination for any sustained injuries should be done both intra- and extra-orally.
- The patient should not leave the office till regaining full consciousness.

If the seizure continues for more than 5 minutes or frequently repeated, then:

- Status epilepticus should be considered and medication should be given including either:
 - Buccal or intranasal 10mg midazolam.
 - IV/IM 10mg diazepam.
 - IV/IM 5mg midazolam.
- Oxygen and respiratory support should be provided.

If the seizure continues for more than 15 minutes, then transfer patient to hospital for further medical intervention.

Stroke (CVA or Cerebrovascular Accident):

CVA is an acute brain damage due to ischemic infarction or cerebral haemorrhage with resultant central nervous system symptom. The ischemic infarction can result from cerebral thrombosis or distant embolism. Furthermore, the intracranial haemorrhage can exert pressure resulting in brain damage (i.e. Stroke). If the symptoms resolved in <24 hour, then the condition is termed as TIA (Transient ischemic attack) (Kalantzis and Scully, 2010).

Risk factors for development of stroke (Little *et.al.*, 2012):

1. Uncontrolled hypertension.
2. Atrial fibrillation.
3. Transient ischemic attack or pervious stroke.
4. Heavy smoking
5. Elevated blood cholesterol levels.
6. Increasing age ≥ 75 years.

Sign and symptom of patients having stroke (Little *et.al.*, 2012):

Identifying the clinical manifestation of stroke can lead to early recognition and initiation of medical intervention which might be lifesaving to the patient (Fig.2). There are four phases from the initiation till establishment of a stroke, these include:

1. TIA (Transient ischemic attack):

This is characterized by transient disturbance to blood supply to a localized area of the brain, resulting in weakening and numbness to one part of the body or speech disturbance that clear in less than 24 hours. A stroke usually preceded by 1 or 2 TIA.



Figure 2 The National Stroke Foundation tool for early recognition of stroke

2. RIND (Reversible ischemic neurological deficit):
Similar to TIA, but continue beyond 24 hours.
3. Stroke in evolution:
In this phase the neurological manifestation has been present for many hours and the symptom become worse with progression of time.
4. Completed stroke:
The sign and symptom of stroke vary greatly depending on the site and size of brain damage and can include hemiplegia, hemiparesis, language disorders, unilateral temporary dimness or loss of vision and changes in behaviour.

Oral manifestation of patients having stroke (Little *et.al.*, 2012):

1. Difficulties in speech
2. Drooping of the mouth corner due to unilateral paralysis of muscles of facial expression.
3. Unilateral loss of sensation of the oral tissues.
4. Lateral deviation of tongue upon extrusion.
5. Oral hygiene might be difficult to maintain therefore food might accumulate around the teeth, under the tongue and in the vestibules.
6. Sever periodontal diseases associated with bone loss.

Dental considerations for management of patients having stroke:

Dental management of those patients could be complicated due to the effect of stroke on the ability of patient to communicate effectively with the health care provider, as well as by the presence of other associated systemic disease and the risk of post-operative bleeding due to the effect of antithrombotic medication (Kalantzis and Scully, 2010).

For effective communication Little and co-workers suggested several techniques to be adopted for such patients including:

1. Facing the patient with eye to eye contact.
2. Use simple language with normal tone of voice with the mask off during communication.
3. Use of sketches to explain the procedure to the patient.

Stroke tends to recur within the first 6 months of initial presentation, therefore only emergency treatment can be provided during this period after consultation with the supervising physician. In addition, patients with symptoms of TIA and RIND should not undergo any elective treatment and do require medical consultation for emergency procedures.

Pain control for those patients is important. Sedation with nitrous oxide can be used safely provided that oxygenation is maintained. Local anaesthesia with epinephrine can be used with a maximum of **2 cartridges**.

Appointment should be stress-free, short and during late morning. Assisted transfer of the patient to the dental chair might be needed from the nurse. And the staff are advised to move slowly around the patients to minimize anxiety.

Those patients might be on different antithrombotic medications which require management as discussed earlier.

If the patient developed signs of stroke, oxygen should be administered and the patient should be transferred to the hospital.

References:

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