

# PREVENTIVE CARE FOR ASPIRATION PNEUMONIA: A CASE STUDY OF AN ELDERLY WITH PARKINSON'S DISEASE

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## SUMMARY

Parkinson's disease (PD) belongs to a group of conditions called motor system disorders and is a progressive neurological disorder that results from degeneration of neurons in a region of the brain that controls body movement. Difficulty in swallowing, chewing, and speaking are among the common complications associated with PD. Dysphagia has been reported as the main cause of aspiration pneumonia and death in PD patients. This case study is about a 78 years male patient, with a problem of dysphagia secondary to PD (stage V). He was admitted due to aspiration pneumonia and poor nutritional status. Various preventive measures can be taken which involve a multidisciplinary approach focussing on the three levels of prevention. Properly trained professionals and adequate allocation of resources may be necessary to establish comprehensive management programs for elderly with PD. The caregiver of such patient should be made aware of the available services and support group to deal with this problem. They should also be made aware on the various preventive actions that can be taken to prevent the incidence of aspiration pneumonia and or to stop the progression of the problem.

**Key words:** Preventive, Care, Elderly, Aspiration Pneumonia, Parkinson's Disease

## 1. Introduction

Parkinson's disease (PD) is a chronic progressive neurodegenerative disorder of insidious onset, characterised by the presence of predominantly motor symptomatology (WHO, 2006). In Western Europe and the majority of populous countries, the prevalence of PD was estimated from 4.1 to 4.6 million in 2005 and the number is projected to reach between 8.7 and 9.3 million in 2030 (Dorsey et al., 2007). In Asia, the prevalence of PD is between 51.3 and 176.9 per 100,000, and the incidence of PD from 6.7 to 8.3 per 100,000 (Tan, 2013). In Malaysia, the prevalence of PD is unknown, but is believed to be increasing as the country ages (Razali et al., 2011).

In the more advanced stages of the disease, the patients become bedbound and severely disabled (Calne & Kumar, 2003). At this stage, patients may have limited therapeutic options (Bunting-Perry, 2006) and need assistance for most activities living. In addition to being debilitating, progressive and shortening one's life, managing PD is expensive (Hogstel, 2001). Patients with PD often develop comorbid disorders that effect health care costs, service utilization and life expectancy (Braga et al., 2014). Prescription drugs account for some 5% of total costs, followed by outpatient care 7.5%, uncompensated care 19%, and inpatient care 20%, while the cost of productivity loss is a staggering 50% (WHO, 2006). Social services costs for treating PD account to 38% of total costs of care and tend to increase with increasing age (Chaudhuri & Ondo, 2010). The challenge of end of life care will grow more serious over the next three decades (Lanoix, 2009).

Patients with PD generally experience bradykinesia, muscle rigidity, resting tremor and posture instability, fixed, stooped posture and autonomic dysfunction (Hogstel, 2001; Linton & Lach, 2007). Gait disturbances and postural instability lead to falls with increased risk of fractures. Additional features for PD are hypomimia and seborrhea of the scalp (Chaudhuri & Ondo, 2010). Dysarthria and hypophonia lead to difficulties in communication (Gershanik, 2010). Excess salivation and consequent drooling may affect patients with PD (Hogstel, 2001). PD is also known to cause motor neuropsychiatric disorder, mental and cognitive disturbance such as depression and Alzheimer's Disease (Hogstel, 2001; Chaudhuri & Ondo, 2010). In PD, it is often difficult to distinguish between a comorbid condition and a consequence of the disease because of its complexity (Braga et al., 2014).

## 2. Aspiration Pneumonia in Parkinson's Disease

Aspiration is defined as the misdirection of oropharyngeal or gastric contents into the larynx and lower respiratory tract (Marik, 2001). Aspiration pneumonia develops after the aspiration of colonized oropharyngeal or gastric contents. Aspiration of pathogens from a previously colonized oropharynx or gastric content is the primary pathway by which bacteria gains entrance to the lungs (Marik & Kaplan, 2003).

Aspiration pneumonia occurs when the cough mechanism is weak due to chest wall rigidity, dyskinesia and upper airway dysfunction (Shill & Stacy, 2002; Braga et al., 2014). There are heightened incidences of aspiration pneumonia in the end stages of PD partly due to impairments in the control of the epiglottic, laryngeal and pharyngeal musculature leading to disorder of the volitional, oral as well as reflex pharyngeal phase of swallowing, suggesting that these patients are "silent aspirators" with lack of awareness of aspiration (Mikaele et al., 2009). Pneumonia developed in 24 of the 100 patients with abnormal cough reflex and swallow function (Marik & Kaplan, 2003). Common complications of aspiration pneumonia include lung abscesses, bronchiectasis and gangrene of the bronchioles (LeMone & Burke, 2008). Aspiration pneumonia, is the most common cause of mortality among PD patients (WHO, 2006).

Dysphagia usually occurs early in the course of PD (Marik & Kaplan, 2003). Dysphagia in an advanced stage of PD may possibly lead to choking, aspiration and death (Calner & Kumar, 2003). Bunting-Perry (2006) stated that advance PD will lead to loss of muscle movements,

chewing and also swallowing. Dysphagia occurs in one third of community-dwelling PD patients but they do not always report swallowing difficulties (Kalf et al., 2012). Marik and Kaplan (2003) stated clinical signs of dysphagia such as difficulty managing secretions, drooling of secretions or food from the mouth, decrease in salivary clearance and poor oral hygiene may be major risk factors for aspiration pneumonia. Tuite et al. (2009) stated that 70% of PD patients will develop hypersialorrhea that contributes to aspiration pneumonia. If patients experience drooling, they might subsequently spill saliva from their oral cavity, or might aspirate the saliva causing aspiration pneumonia (Srivanitchapoom et al., 2014). Deglutition disorders also increase the risk of aspiration pneumonia (Gershanik, 2010).

Feeding via nasogastric tubes (NGT) will also increase the risk of aspiration pneumonia. Since the NGT feeding bypasses the small amount of gastric contents through to the oropharynx, the materials can be easily aspirated into lower airways in dysphagic patients (Teramoto, 2006). Gomes et al. (2003) stated that the mechanisms responsible for aspiration in patients bearing a NGT feeding tube are loss of anatomical integrity of the upper and lower esophageal sphincters; increase in the frequency of transient lower esophageal sphincter relaxations; and desensitization of the pharyngoglottal adduction reflex. Depending on the patient's position, and volume of gastric content and size of feeding tube, aspiration pneumonia can lead to mortality with incidence ranges from 3-33% (Forcica et al., 2000).

### 3. Case summary

A 78-year-old man with a history of dysphagia secondary to PD (stage V) was admitted to hospital due to aspiration pneumonia and poor nutritional status.

One week prior to admission, the patient was pulled out of NGT feeding and was taking meals without using NGT but with massive difficulties. He developed shortness of breath after taking food, reduced oral intake, occasionally cough and seen keeping food in the cheek while eating. His urine output seems reduced as he only being able to urinate once a day with concentrated colour. Apart from that, he had low grade of fever, intermittently, worsening at night and partially relieved by anti-pyretic.

Physically he looked lethargic with moderate dehydration as evident by poor skin turgor, sunken eyeball, coated tongue and delayed of capillary filling test. He was also tachypnoeic with excessive use of accessory muscles; suprasternal and subcostal recession. He has several features of parkinsonism such as masklike facial expression, fixed and wide open eyes, drooling and pill rolling tremor (Swinn, 2005). Additionally, examination of the musculoskeletal system showed the presence of cogwheel rigidity in both upper and lower limbs as well as muscle wasting. His skin looks slightly pallor and oily. On further examination of his respiratory system revealed consolidating dullness on right lower zone with reduce air entry on auscultation. Other system was unremarkable.

Premorbidly, he was dependent both on activities of daily living (ADL's) and instrumental activities of daily living (IADL's). He lives with his wife who was also not physically well. His son, who stays nearby to his house is looking after him during the day.

## 4. Preventive Care for Aspiration Pneumonia in Parkinson's Disease

Family support and health care services should be delivered in a multi-disciplinary team-based format (Giles & Miyasaki, 2009; Lanoix, 2009). Care of patient with aspiration pneumonia in PD should focus on improving quality of life and maintaining supporting functions (Linton & Lach, 2007). Preventive care for aspiration pneumonia in PD includes primary, secondary and tertiary prevention. Health promotion and education, early assessment and symptomatic care, pharmacological therapy and complication prevention are included in the care program.

### 4.1 Primary Prevention

Primary prevention refers to interventions to prevent the occurrence of disease and reduce its incidence (Stanhope & Lancaster, 2014). Primary prevention in this case is by preventing and lowering risk factors for aspiration pneumonia through patient education initiatives. Education for family members could help improve the understanding of the disease (Hurt et al., 2012). The health education for this patient included safe NGT feeding, oral care, hand washing and identifying signs and symptoms of pneumonia.

#### 4.1.1 Safe NGT feeding

NGT feeding is needed for elderly patients with severe dysphagia and aspiration in whom improvement of swallowing is likely to occur (Marik, 2011). In order to prevent aspiration, the caregiver should be educated on proper NGT feeding. The following considerations are important:

- Tube length and secure tape should be checked every four hours during tube feeding (Opilla, 2003). This is to verify the tube placement is not dislodged and remains in the stomach.
- The patient should be placed in an upright position or at least at a 30-degree angle during, and one hour after feeding (Perry & Potter, 2004).
- Measure gastric residual volumes every 4 to 6 hours during feedings and immediately before each intermittent feeding. It is standard practice to check aspirates in NGT-fed patients to determine if the formula is being retained in the stomach (Opilla, 2003).
- Ask the patient if any of the following signs of gastrointestinal intolerance are present: nausea, feeling of fullness, abdominal pain or cramping. These signs are indicative of slowed gastric emptying that may, in turn, increase the probability for regurgitation and aspiration of gastric contents (Metheny, 2012).

#### 4.1.2 Oral care

Infected teeth and poor oral hygiene are predisposed to pneumonia following the aspiration of contaminated oral secretions (Loeb et al., 2003; Metheny, 2012). Tube feeding in elderly persons is associated with significant pathogenic colonization of the mouth (Marik & Kaplan, 2003). Oral care is important to reduce mouth odour, remove excessive saliva, to promote oral hygiene, enhance feelings of well-being (Loeb et al., 2003). Oral care after each meal lowers the risk of aspiration pneumonia among the elderly (El-Solh, 2011).

The caregiver should be trained on proper oral care for this patient. A piece of gauze wrapped around the finger or spatula can be used as a cleansing tool. Clean it with oral anti-septic

agent such as chlorohexidine or listerine to the upper and lower lips, left and right buccal mucous membranes, palate, and tongue. In NGT-fed patients, cleaning the tongue and palate can help to prevent aspiration pneumonia (Ueda, 2011).

#### **4.1.3 Hand washing**

Hand washing that involves scrubbing the hands with soap, water and friction is a simple means of preventing infection. Hand washing practices and appropriate handling of NGT feeding can reduce the spread of infection (Mutsuo et al., 2001). Rabie and Curtis (2006) conducted a systematic review stated hand washing decreases the incidence of respiratory infection. The caregiver should be encouraged to remove dirt and organic substances by washing their or the patient's hand in each palm, fingers and fingernails. Hand washing should be done frequently especially before and after feeding, toileting or performing personal care.

#### **4.1.4 Identifying sign and symptom of pneumonia**

The caregiver should be advised to be aware of these signs and symptoms so as early detection and treatment can be given to the patient. Common signs and symptoms of pneumonia among elderly are slight cough, mild fever, shortness of breath, confusion and behavioural changes, excess sweating and/or clammy skin, headache and fatigue resulting in excessive sleeping/ lethargy (Eliopoulos, 2014).

#### **4.2 Secondary Prevention**

Secondary prevention involves interventions to increase the probability that a person with a disease will have that condition diagnosed at a stage when treatment is likely to result in cure (Stanhope & Lancaster, 2014). Secondary prevention based on this patient was identified as aspiration pneumonia in its earliest stages, when it is most likely to be treated successfully. The appropriate interventions for this patient were early assessment (swallow screening, diagnostic and laboratory test) and prompt treatment (oxygenation, airway clearance and comfort, medication as well as hydration and nutrition).

##### **4.2.1 Early assessment**

Early assessment for this patient were includes swallow screening, diagnostic and laboratory test.

###### **4.2.1.1 Swallow screening**

The test is performed to provide risk estimates for aspiration and therapeutic techniques to improve swallowing. The speech therapist will ask for the history of disease process and symptoms (motor symptoms and cognition). The patient was assessed for the musculature involved in swallowing, observe feeding patterns including rate of food intake, ability to chew, holding food or liquid in the mouth and ability to initiate a swallow. The Ministry of Health (2012) stated that patients are required to be inserted with NGT if they failed the swallowing test to prevent aspiration.

#### **4.2.1.2 Diagnostic and laboratory test**

Chest x-ray and Full Blood Count (FBC) were common by used to diagnose pneumonia (Hogstel, 2001). Chest x-ray result of this patient showed haziness of the lungs indicated of aspiration pneumonia. Increases in white blood count (WBC) showed of leucocytosis. Besides, Arterial Blood Gases (ABG) test indicated of respiratory failure condition while C-reactive protein (CRP) and erythrocyte sedimentation (ESR) revealed as acute systemic reaction secondary to pneumonia. Blood culture and sputum analysis tests were done before the initiation of antibiotic therapy. However, elderly patients often are unable to produce a specimen in the initial stage of pneumonia (Linton & Lach, 2007).

#### **4.2.2 Prompt treatment**

Early assessment for this patient were includes oxygenation, airway clearance and comfort, medication, hydration and nutrition.

##### **4.2.2.1 Oxygenation, airway clearance and comfort**

Oxygen therapy may be given for hospitalized patients. In this case, the patient was put on 5L/min of facemask oxygen. The patient's response can be monitored by continuous oxygen saturation (SPO<sub>2</sub>) and ABG. SPO<sub>2</sub> greater than 94% is considered normal (Linton & Lach, 2007). Oral and nasal suctioning is needed to eliminate excessive secretion.

Chest physiotherapy was performed to reduce lung consolidation and to prevent atelectasis. Percussion and vibration results in breaking up thick secretions in the lungs so that it can be more easily removed (Linton & Lach, 2007). The patient was asked to rest in bed and was positioned in the Fowler's position to promote lung expansion and to facilitate the movement of secretion as well as for energy conservation.

##### **4.2.2.2 Medication**

Decisions about drug therapy are based on clinical presentations and laboratory result. This patient was prescribed with Augmentin 625 mg bd and Fluimucil 200 mg tds. Augmentin is an antibiotic used to treat community-acquired respiratory tract infection while Fluimucil is a mucolytic agent used to reduce the viscosity of mucous secretions (MIMS Malaysia, 2015). The patient was given Folate 5 mg od, Vitamin B complex 1/1 od and multivitamin 5 mls od as a dietary supplement to improve and maintain nutritional status (MIMS Malaysia, 2015).

##### **4.2.2.3 Hydration and nutrition**

In general, a patient with pneumonia should consume at least 3L/day of fluid to maintain hydration (Linton & Lach, 2007). This patient received intravenous drip (IVD) 2 pint 0.9% normal saline alternate with 1 pint dextrose 5% to treat hydration. Jevity feeding was given via NGT for nutritional repletion and hydration. Jevity is an isotonic, fiber-fortified, high-nitrogen liquid formula provides complete, balanced nutrition for patients requiring short or long-term tube feeding (Abbott Nutrition Malaysia, 2010).

### **4.3 Tertiary Prevention**

Tertiary prevention refers to interventions to reduce the disability of a disease that has already developed and slowing its progress (Stanhope & Lancaster, 2014). The aim is to restore self-sufficiency to limit the complications and disabilities associated with the disease. Tertiary prevention in this case includes both surgical treatments and community resources.

#### **4.3.1 Percutaneous Endoscopic Gastrostomy (PEG)**

In order to prevent recurrence problems, this patient was scheduled to undergo percutaneous endoscopic gastrostomy (PEG). NGT feeding have fewer complications and incur lower cost than parenteral feeding, however, there are risks for aspiration pneumonia and electrolyte disturbances (Swinn, 2005). Besides, NGT has been associated with physical discomfort and psychosocial implications. NGT are usually poorly tolerated, make the patient agitated (many patients will pull the tube out) and the volume of feeding is often inadequate (Pennington, 2002). NGT may also be associated with complications such as nasopharyngitis, oesophagitis and epistaxis and risk for aspiration (Swinn, 2005).

A gastrostomy tube is more comfortable than NGT for prolonged use in dysphagic patients (Ministry of Health, 2012; Metheny, 2012). According to Pennington (2002), in any condition when dysphagia is expected to be present for more than a few weeks, the use of a PEG tube is preferable to NGT intubation. Non-oral feeding is believed to prevent aspiration pneumonia, improve function, promote physical comfort and prolong life (Mamun & Lim 2005; Teramoto et al., 2006).

#### **4.3.2 Social support and community resources**

In the advanced stage of PD, the psychosocial aspects of the disease can be severe (Bunting-Perry, 2006). Hasson et al. (2010) stated that caregivers had not received adequate information and support about the illness or its progression.

The caregiver was advised to get physical and psychological assistance from palliative care services or home care nurse services. These services are able to provide safe medical and personal care of the patient and support the family. The patient and caregiver were advised to join the Malaysian Parkinson's Disease Association (MPDA). Accurate information from community resources is important in reducing caregiver strain and improves skills to provide better care and an increased social support network.

#### **4.3.3 Emergency call**

The caregiver needs to be aware of emergency helplines. If the patient has an episode of aspiration or choking, the caregiver was advised to dial 999 (fixed line) or 112 (from a mobile phone) for emergency guidance and response from ambulance and hospital.

## 5. Conclusion

In conclusion, aspiration pneumonia is the most common complication affecting the elderly with advanced PD. Such a patient requires preventive care through a multidisciplinary team approach at the primary, secondary and tertiary prevention. To better support this approach, there is a need for a greater number of properly trained professionals from government and private healthcare facilities. Adequate allocation of infrastructure and human resources in urban and rural areas to establish comprehensive management programs for PD patients are needed. Nurses in public health and home care setting need to increase their awareness, knowledge and skills in preventing aspiration pneumonia among patients with PD. The local public health team need to be integrated on preventive care to address the current problems. Health education and campaign, health assessment and screening as well as strengthen public health care delivery within the existing health services may prevent occurrence of the disease.

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