Oral health and pneumonia: a case study analysis

As aspiration of bacteria in oropharyngeal secretions is an important risk factor for pneumonia in the young and elderly, poor oral health may also contribute to the development of pneumonia. This article provides a case study analysis of the links between oral health and pneumonia.

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Aspiration pneumonia
Aspiration pneumonia occurs when food, saliva, liquids, or vomit is breathed into the lungs or airways leading to the lungs. Aspiration of bacteria from the oral and pharyngeal areas causes bacterial pneumonia (MedLinePlus, 2013).

Nursing-home-acquired pneumonia (NHAP)
NHAP is defined as pneumonia occurring in a resident of a long-term care facility or nursing home. NHAP is one of the most common infectious diseases in long-term care facilities and is a significant cause of mortality and morbidity among residents of such facilities. NHAP primarily affects elderly people and shows no sex or race predilection. NHAP more closely resembles CAP than nosocomial pneumonia and is considered diagnostically and therapeutically synonymous with CAP.

Pneumonia is the leading cause of infective cause of death in nursing home residents, with a mortality rate of 12–21% (World Health Organisation, 2013). There has been some suggestion that improving oral hygiene in this group of patients may reduce the rates of pneumonia as NHAP pathogens appear to be micro-aspiration of infected oral secretions (Scannapieco et al, 1996).

Symptoms of pneumonia
In previously healthy individuals, pneumonia may present with a 1–2 day history of cough, fever, dyspnoea, fatigue, rigors and pleuritic pain. Cough can be dry...
and persistent, or it may be productive. In elderly patients, coughing and chest pain may not be present at the early stage of disease, and fever and confusion may be the only presenting symptoms. Worsening of chronic illnesses may also be apparent; individuals with other chronic diseases and the elderly are likely to be very lethargic, have poor appetite and may frequently fall, owing to weakness and disorientation (Nair and Niederman, 2011).

On examination, respiratory rate is likely to be rapid, crackles may be audible on inspiration and there may be evidence of pleural effusion (dullness on auscultation or obvious lack of expansion of ribcage on inspiration). In the community, CAP is diagnosed on clinical signs and symptoms and no specific investigations are routinely recommended.

**Risk factors**

Patients at risk of developing nosocomial pneumonia while in hospital include those who:
- Are alcoholic
- Have had chest surgery or other major surgery
- Have a weak immune system from cancer treatment, certain medicines, or severe wounds
- Have long-term (chronic) lung disease
- Breathe saliva or food into their lungs as a result of not being fully alert or having swallowing problems
- Are older
- Are intubated/ventilated
- Have suffered a stroke
- Are being fed via percutaneous endoscopic gastrostomy/nasogastric tube.

Risk factors that increase your chances of getting CAP include:
- Chronic lung disease (COPD, bronchiectasis, cystic fibrosis)
- Cigarette smoking
- Dementia, stroke, brain injury, cerebral palsy, or other brain disorders
- Immune system problem (during cancer treatment, or due to HIV/AIDS, organ transplant or other diseases)
- Other serious illnesses, such as heart disease, liver cirrhosis, or diabetes mellitus
- Recent surgery or trauma
- Surgery to treat cancer of the mouth, throat, or neck.

**Oral health maintenance**

Three factors are needed to maintain oral health: hydration of the tissues; the cleansing, microbial properties of saliva; and debridement of the teeth and tongue (Sweeney, 2005). The oral cavity needs to be kept moist and hydrated. Saliva is central to maintaining a healthy mouth. Human saliva is 99.5% water. The other 0.5% contains numerous antibacterial components, such as histatins, defensins, cathelicidin, lysozyme, lactoferrin, and lactoperoxidase, which maintain a balance of oral microbial populations (Scannapieco et al, 2003). Lack of saliva due to, for example, medication, head and neck radiation or nil-by-mouth patients, may promote an overgrowth of bacteria. As bacteria has a cleansing effect, there may well be an increased build up of plaque. This build up of plaque is not exclusive to patients with teeth. Dentures, both fixed and removable, can also foster plaque and bacterial formation. Saliva substitutes have been found to be useful. BioXtra® gel (RIS Products Ltd), which contains lysozyme, lactoferrin and lactoperoxidase, has been recommended for lubricating mucous membranes (Dirix et al, 2008). However,
The figure above shows a patient who has recently suffered a stroke and is recovering on a rehabilitation ward. From the stroke point of view, the lady is receiving excellent care – all care plans are in place and up to date and the medical staff seem happy with her recovery. There is, however, no care plan in place for oral care and it is obvious that her oral condition needs some attention. The patient is PEG fed (percutaneous endoscopic gastrostomy – a tube which is passed into the patient's stomach as a means of feeding) and the patient has three lower anterior teeth, the oral cavity is red and dry, and there is some evidence of oral thrush. This patient is at a high risk of developing a nosocomial pneumonia.

The author feels that whichever saliva substitute is used, be it a gel or a spray, they are often not applied or delivered correctly; caution, for example, needs to be taken with artificial sprays in patients with swallowing issues. Attention must also be placed on using a spray that is pH neutral and ideally one that contains fluoride.

**Twice-daily brushing**

The single most important oral hygiene activity has been shown to be twice-daily brushing to reduce oral debris and dental plaque (Sweeney, 2005). However, it seems that the favourite tool of choice for nursing staff is still foam swabs. This comes after the plethora of issues surrounding the safety of pink swabs (MDA/2012/020) (Medicines and Healthcare products Regulatory Agency, 2012). These swabs are designed to be single use but in many cases are left by the bed soaking in a mouthwash. The same swab is sometimes used on many occasions during the day.

**Electric toothbrushes**

Electric toothbrushes have been shown to be more effective in plaque removal and cleaning in gingival crevices compared with manual toothbrushes (Prendergast, 2012). However, in the author's opinion, nursing staff should be trained on the use of an electric toothbrush on a patient as trauma to the mucous membranes is possible. A fluoride toothpaste should be used at all times and a non-foaming toothpaste may be considered as this is useful in patients who are unconscious or are at risk of aspiration.

**Flossing**

Flossing is also encouraged and has been shown to reduce plaque formation and gingivitis, but has not been introduced for hospitalised patients (Prendergast, 2012). Care needs to be taken with flossing in the mouths of patients who have low platelet levels, as they may have a tendency to bleed (Macmillan Cancer Support, 2013).

**Chlorhexidine mouthwash**

There has been much research around the use of chlorhexidine to reduce nosocomial pneumonia. Twice-daily oral hygiene care with 0.12% chlorhexidine gluconate may hold promise as a nosocomial pneumonia reduction strategy within hospital critical care units; however, its application requires further testing (Bopp et al, 2006). Effective plaque removal with a toothbrush or a suction/powered toothbrush must always be the first step in effective oral care of this patient group.

**Oral assessment**

The gold standard is for each patient to have an oral assessment on admission to hospital. This can establish the patient's baseline oral health status and then ongoing assessments can highlight any changes during the course of care and interventions can be initiated (Prendergast, 2012). It must be stressed that any assessment tool is only as good as the individual who is undertaking the assessment. This is where training and education comes to the forefront of care.

**Conclusion**

The author would also like to stress that although this article has, as many other papers written on this topic, highlighted the need for effective oral health for all individuals, the actual deliverance of this care can at times be a challenge. Having worked in both hospital and community.
Case study 2

A 62-year-old man who has been treated with surgery and head and neck radiotherapy for a tongue cancer. He is edentulous and has had the whole of his tongue removed. As he has been treated with radiotherapy, his salivary glands have been compromised and, as such, he has a dry mouth. This is also exacerbated as he is now fed totally via a PEG.

The patient’s wife is discharged home with a portable suction machine and district nurses will visit regarding the PEG. Review appointments are organised with the maxillofacial consultant from the oral cancer perspective. Over the next few weeks the mouth becomes dryer and crusty plugs form around the oral cavity. The patient’s wife is trying to remove these plugs with eyebrow tweezers and hence these areas start to bleed. Within a period of time the patient is admitted back into hospital with a pneumonia. It is suggested that this is due to aspiration from the oral cavity.

There is a cost implication here as the patient had recovered from his oral cancer and then subsequently contracted a pneumonia, which meant further hospital stays and treatment. It also had an impact on the patient’s quality of life, which is often overlooked. This case highlights the need for education and training to not only the patient and carers but also the ward staff, district nurses and community staff.

As an in-patient the mouth is regularly cleaned and kept lubricated with an oral lubricating gel. This is performed under instruction from the Macmillan oral health practitioner based at the hospital. Once discharged home the patient and wife are asked to attend a nurse-led clinic monthly to review the mouth and instruct the pair on the best way to maintain the cavity. The picture below shows the mouth clean, moist and infection free months after discharge, and no further chest infections have been reported.

settings, the author has seen first-hand the barriers that staff encounter on a daily basis. Oral assessment tools are often seen as another form to fill in and very rarely has any training on how to assess the oral cavity been provided. This is without taking into account the non-compliant patient with dementia, the intubated patient with equipment making oral care deliverance difficult, the patient with aspiration issues, and many more barriers. It has been suggested in the past that lack of oral care has been down to the lack of importance placed on it; the author would argue that although this is often the case, staff need to be armed with the correct tools to perform the task and always backing this up with training.

KEY POINTS

- A clean and lubricated oral cavity is a basic need and can impact on a patient’s systemic health.
- Raised education and awareness of oral health and its links to pneumonia are imperative in its prevention and treatment.
- Better use of dental professionals in the assessment and subsequent treatment of patients with pneumonia may improve patients outcomes.

Prendergast V (2012) Safety and efficacy of oral care for intubated neuroscience intensive care unit patients. Lund University, Faculty of Medicine Doctoral Dissertation Series, Sweden