

## Editorial

### Post Stroke Infection and Management Difficulties: A Burning Issue

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Stroke has a major global impact on mortality and morbidity. Stroke is the second leading cause of death worldwide (Pandian et al., 2012). It is responsible for nearly six million deaths every year and thereby claims more lives than AIDS, tuberculosis and malaria put together (Grube et al., 2013). Furthermore, it is a leading cause of permanent disability worldwide.

Patients with stroke are susceptible to a wide array of medical complications which have been linked with the clinical outcome. Infections, in particular pneumonia and urinary tract infections (UTI), are among the most frequent complications (Ersoz et al., 2007). A number of different mechanisms may increase the risk of infections in by patients with stroke. These mechanisms may both be direct consequences from the brain injury caused by the stroke and indirect mechanisms caused by factors associated with but not caused by the stroke like high age and comorbidity.

As a direct consequence of the stroke, the patients often experience symptoms that may facilitate infections. These symptoms include immobility, dysphagia which increases the risk of aspiration, impaired cough reflexes and bladder dysfunction (Roth et al., 2007). The adverse impact of these symptoms on the risk of infections may be further strengthened by the difficulties or even inability of the patients to communicate and cooperate due to coma, aphasia, dementia and/or delirium. Chest infection is a common complication of acute stroke (Ersoz et al., 2007). Chest infection carries an 3-fold increase in risk of death and has the highest attributable mortality of all medical complications after stroke. Chest infection is also associated with a greater likelihood of discharge to a nursing home and increased length of hospital stay (Indredavik et al., 2008).

Previous studies have identified a diverse set of factors that may predispose an individual to chest infection early in the course of stroke. These include greater severity of neurologic impairment, older age and diabetes mellitus (Pandian et al., 2012). An unsafe swallow also may be an important contributor, with dysphagia or failed initial swallow evaluation associated with an increased risk of chest infection after stroke. Additionally, many other risk factors for chest infection have been identified in studies of non-acute stroke patients and elderly populations, including oral health and the presence of oral pathogens (Forti et al., 2013). Pneumonia is a major cause of in-hospital morbidity and mortality in acute stroke population and attributes to increase the length of hospital stay and hospitalization cost (Pandian et al., 2012). Another study has been posited a staged model for aspiration pneumonia. This includes dependence for oral care, contributing to altered oral flora. This in turn is increased in concentration in the saliva, which has been reduced in volume by the action of (multiple) medications. It constitutes a possible mechanism whereby bacterial colonization is aspirated into the lungs. Effective prevention and treatment of infections should therefore be an important component in any strategy aiming to reduce the impact of stroke (Koennecke et al., 2011).

Invasive procedures such as urinary catheters, intravenous lines and tubes used for mechanical ventilation constitute easily accessible routes for entering the body for pathogens (Sellars et al., 2007). Permanent urinary catheters is associated with a particular high risk as it is associated with an absolute risk of urinary tract infections of 3 to 10.0% per day of catheterization leading to an almost 100.0% risk after 30 days in general medical populations (Westendorp et al., 2011).

Urinary tract infection (UTI) is thought to be a common complication of stroke. Previous studies have found a highly variable incidence of between 3% and 44% (Graves et al., 2007). Factors claimed to

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predict increased risk of UTI include stroke severity, depressed conscious level increased post-void residual urine volume and diabetes mellitus. However, many of the studies of post-stroke UTI have limitations, including short follow-up, retrospective design, small sample size or a highly selected (Liu et al., 2011) and therefore potentially unrepresentative cohort such as participants in a randomized controlled trial or subjects entering a specialist rehabilitation facility (Koennecke et al., 2011).

UTI is associated with morbidity and as a consequence may interfere with rehabilitation. It has been claimed that there is an independent association between UTI and poor stroke outcome (Lee et al., 2007). Therefore, prevention and prompt treatment of UTI in stroke patients might improve outcome.

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