Death rattle is a phenomenon frequently observed during the final hours of dying patients. Its occurrence is thought to cause distress on relatives and staff. The control of death rattle includes both general measures and pharmacological means. This article is a brief review of literature looking into the impacts of death rattle. The efficacies of the different anti-muscarinic drugs in the management of death rattle are also studied.

**Introduction**

Death rattle is the noise caused by the turbulent air flow through the accumulated secretions in the oropharynx and bronchial tree. This is often observed at the final stage of life when patients are no longer capable of swallowing, resulting in the pooling of secretions. Studies found the incidence of death rattle ranged from over 20% to half of all dying patients. The occurrence of death rattle is recognized as a strong predictor of imminent death. Wildiers noted that 76% of patient died within 48 hours of onset, while Käss et al found the median time of death since the onset of death rattle was 16 hours only.

The salivary glands and the bronchial mucosa are the main sources of airway secretions. Two muscarinic receptors, the M2 and M3, are involved in the regulation of secretions. While vagal stimulation increases the volume of airway secretions, it has been shown that anti-muscarinic drugs effectively reduce the secretions by antagonizing acetylcholine at the muscarinic receptors.

**Impact of Death Rattle**

Death rattle is a common phenomenon among the dying patients. Studies have found the incidence of 23% to 49%. Wee BL et al looked into the meaning of death rattle to relatives and found relatives interpret the sound of death rattle in a variety of ways. About half of the relatives found it distressing. Others, however, were neutral or found it a helpful sign of impending death. These authors also looked into the impact of death rattle on staff and volunteers and found that most expressed negative feelings about hearing the sound which may influence their decision to intervene.

**Management of Death Rattle**

Both non-pharmacological and pharmacological measures could be applied to dying patients with death rattle. These patients should be positioned on their side or in a semi-prone position with occasional gentle suctioning of oropharyngeal fluids. Communication with relatives will be helpful in addressing fears and distress caused by the rattling noise.

Anti-muscarinic medication is the mainstay of pharmacological therapy for the management of death rattle. Common drugs being used include hyoscine hydrobromide, glycopyrronium, hyoscine butylbromide and atropine.

Several studies had compared the effectiveness among these medications. Hughes et al did a prospective audit and found that a single dose of any of the drugs hyoscine hydrobromide, hyoscine butylbromide and glycopyrrolate led to improvement in 35-54% of patients. Results demonstrated no overall difference in symptoms alleviation among the three drugs. Back et al compared hyoscine hydrobromide and glycopyrrolate in the treatment of death rattle noting the noise scores at the start,
30 minutes, an hour and 4-hourly thereafter. They concluded that glycopyrrolate 0.2mg is less effective at reducing death rattle than hyoscine hydrobromide 0.4mg when assessed at 30min, and the use of glycopyrrolate may lead to an increased need for other sedatives or anti-emetic medications. Using the Liverpool Care Pathway, Hugel et al\textsuperscript{10} also compared these two medications. They found a significant difference in the overall response between the two groups. All patients in the glycopyrronium group had some response to the medication whereas 22% of patients in the hyoscine group had no response. More patients in the hyoscine group died with respiratory tract secretions present.

In the Cochrane review 2008\textsuperscript{11}, only one study\textsuperscript{12} fulfilled the inclusion review criteria. This was a randomized controlled trial examining the efficacy of scopolamine 0.5mg iv / sc given at time zero, four and eight hours. The intervention group showed a tendency to reduced death rattle than the control group in the first 10 hours but the difference was not significant.

Recently a Belgium group conducted a multicenter open-label, prospective, randomized trial comparing the effectiveness of atropine, hyoscine butylbromide and scopolamine for the treatment of death rattle\textsuperscript{13}. They assigned patients randomly to one of the three groups given a sc bolus dose of the respective medication followed by a regular dose or continuous infusion of the drug. In the atropine group, a bolus of 0.5mg was followed by 3mg/24hr infusion or 0.5 mg q4H. In the scopolamine group, the bolus dose given was 0.25 mg then followed by 1.5mg/24 hr infusion or 0.25mg q4H. For the hyoscine butylbromide group, a 20mg bolus was followed by 60mg/24hr infusion or 10mg q4H. The rattling was scored at 30min, 60min, 4, 12, 24 hours and then, every 24 hours till death. They concluded from this study that treatment effectiveness improved steadily up to 24 hours and there was no significant difference in effectiveness among the three drugs either at 1 hour or up to 48 hours. The treatment is more effective when started at a lower baseline rattle score although this difference in efficacy as a function of intensity was no longer seen after 48 hours of treatment. They found no difference in the median and mean survival time among the 3 groups, and similar effectiveness was seen among different classes of primary tumors or among different age categories.

**Conclusion**

Death rattle is a frequent clinical sign at the end of life, and its occurrence is a strong predictor of imminent death. Rattling noises have been shown to cause distress to relatives and staff thus warranting interventions. Management of death rattle included both non-pharmacological and drug treatment. Where different anti-muscarinic drugs are available for the control of respiratory secretions, there is to date no evidence of significant differences in effectiveness among these medications used.

**References**