



Improved Oral Hygiene in Adult Critical Care Patients Reduces the Incidence of Ventilator-Associated Pneumonia.

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Introduction

Up to 20% of patients receiving mechanical ventilation for >48 hrs develop ventilator-associated pneumonia (VAP) [1]. Dental plaque and oro-pharyngeal (OP) secretions from intubated patients contain organisms capable of causing VAP [2] which may reach the lower airways following micro-aspiration around the low-pressure, high-volume cuffs of modern tracheal tubes [3]. Our hypothesis was that (i) improved physical cleansing of the OP cavity, (ii) introducing an anti-bacterial substance into the OP and (iii) reducing the volume of OP secretions would reduce the likelihood of the microaspiration of a bacterial-rich “inoculum” into the tracheo-bronchial tree and so reduce the incidence of VAP.

Methods

The Regional ICU is a tertiary referral unit admitting over 800 adult patients per year with over 90% receiving invasive mechanical ventilation. In one zone of the ICU, an intervention, designed to improve oral hygiene and aid protocol compliance, was commenced. The intervention included 8 hourly OP cleaning, toothbrushing, suctioning of the OP and hypopharynx, moisturization of lips and mucous membranes, instillation of cetylpyridium chloride antiseptic oral rinse [4]. Hardware aiding this intervention included single use suction catheters, suction toothbrushes and a yankauer suction head with a retractable sheath (replaced daily) designed to minimise contamination from (and of) the bedside environment. Nursing staff in the remainder of the ICU delivered standard oral hygiene – unspecified in terms of frequency or technique and at the discretion of the bedside nurse (concurrent control). All patients on mechanical ventilation were reviewed daily for VAP using NNIS criteria [5] by infection surveillance staff unaware of the intervention.

Results

During the 4 month study period, 71 patients were admitted to the intervention zone (Group A) and 189 patients were admitted to control beds (Group B). The casemix of the groups was similar with one exception — a higher proportion of neurosurgical patients in the Group A (25%, n=18) than in Group B (14%, n=27). Table I summarises the results. Values for age, length of ICU stay (LOS) and admission APACHE II score are shown as medians and interquartile ranges.

The frequency of cases of VAP in the intervention group (2.8%) was less than half that of the control group (6.3%). The incidence of VAP (per 1000 ventilator days) in the intervention group (4.37) showed a reduction of over 40% compared to the control group (7.57).

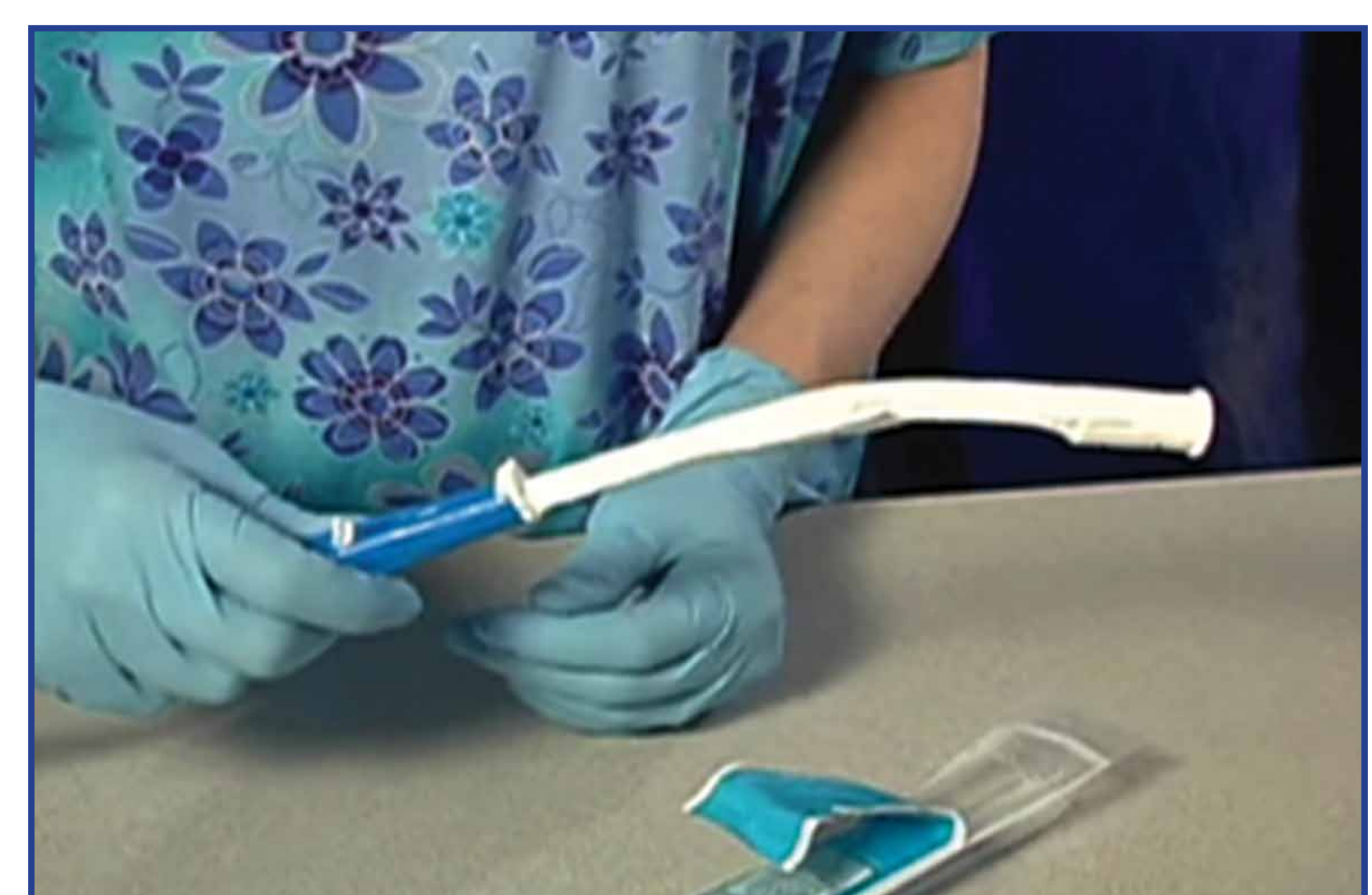
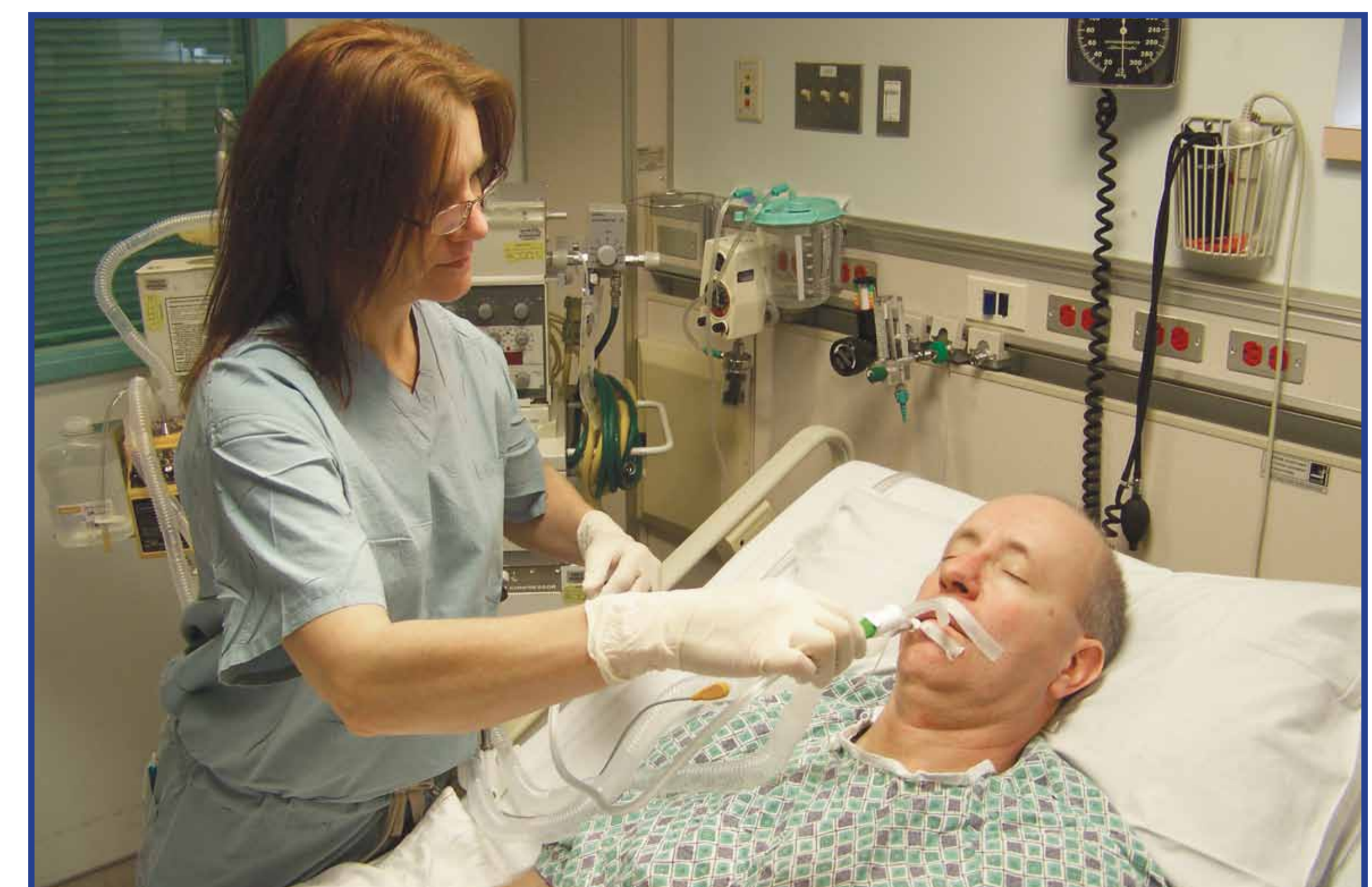
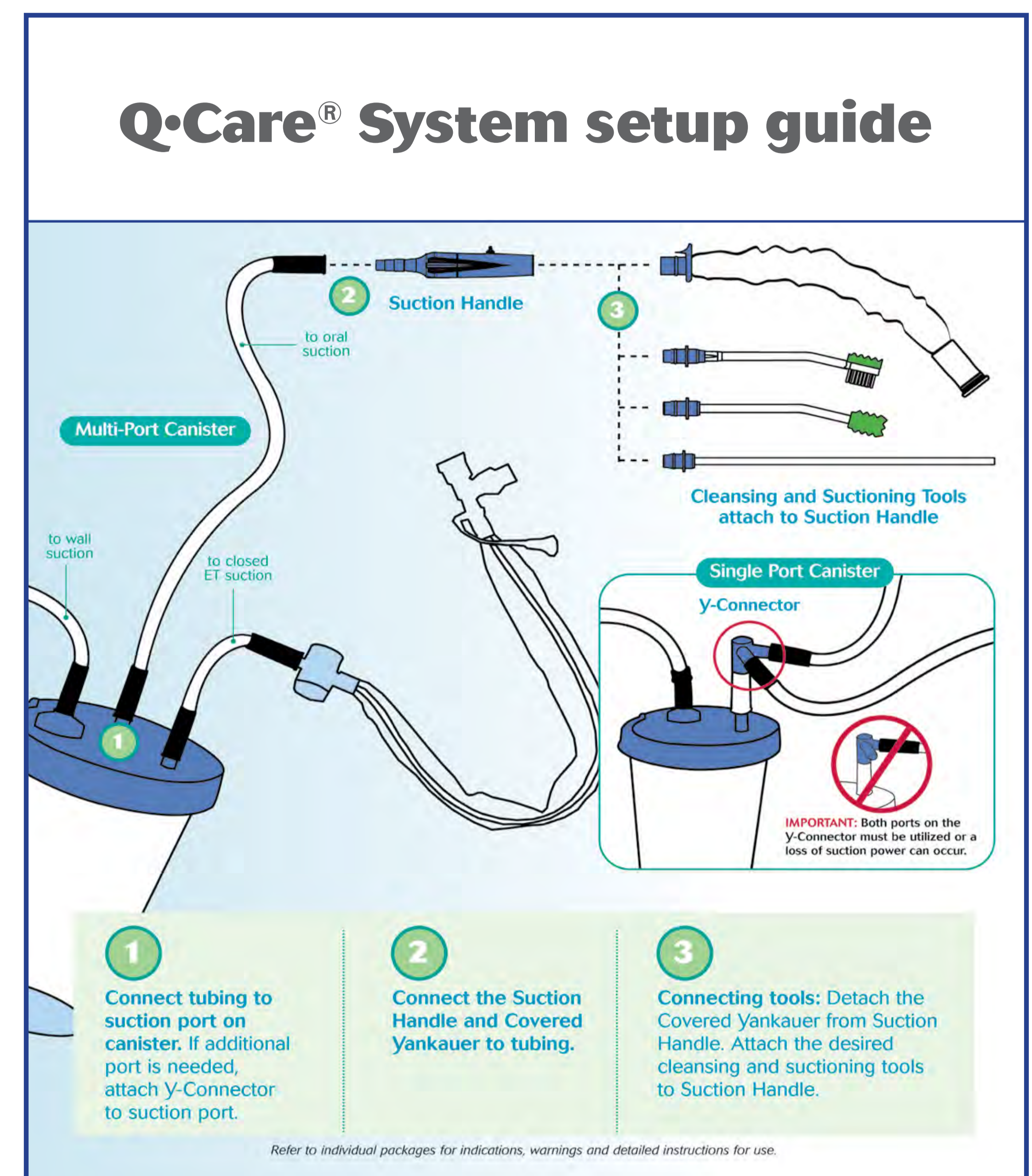
Table I: Patient details and incidence of VAP.

Group n	Age (yr)	ICU LOS (days)	Admission APACHE II	Total vent days	VAP n %	VAP/1000 vent days
A n=71	51 (30-64)	7 (4-11)	16 (13-18)	457	2 2.8	4.37
B N=189	56 (29-69)	8 (4-13)	18 (14-20)	1584	12 6.3	7.57

Conclusion

An intervention to improve oral hygiene and reduce contamination of the bedside environment was associated with a significant reduction in the frequency of VAP in adult general ICU patients.

Since VAP may result in a mean increase in ICU LOS of >4 days [6], the reduction of 3.2 cases per 1000 ventilator days, if repeated across our total patient population (receiving 6200 of ventilation annually) would mean 20 fewer VAPs and a reduction in ICU requirement of > than 80 days per year.



References

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