به نام خداند بخشنده مهربان

دکتر کمالی
متخصص بیماریهای عفونی
آبان ۱۳۹۵

ریسک فاکتورهای پنومونی بیمارستانی

عفونتهاي بيمارستاني مشكل مهم در مراكز درماني و از علل شايع و مهم افزايش طول مدت بستري، هزينه هاي بيمارستاني و مرگ بيماران محسوب ميشوند .از اين ميان پنومواني بيمارستاني ۱۵ تا ۲۰ درصد اين عفونتها را تشكيل ميدهد و با مرگ و مير بالايي همراه است.

دانستن ریسک فاکتورهای مرتبط با پنومونی بیمارستانی هم در کنترل وپیشگیری از بروز بیماری اهمیت دارد وهم در انتظار بروز بیماری در افراد با ریسک بالا

- *The most significant risk factor for hospital-acquired pneumonia (HAP) is mechanical ventilation.*

- ●Increasing age (>55 years)
- ●Chronic lung disease
- ●Depressed consciousness
- ●Aspiration
- ●Chest or upper abdominal surgery
- ●The presence of an intracranial pressure monitor
- ●Agents that increase gastric pH (H2 blockers, antacids, proton pump inhibitors
- ●Previous antibiotic exposure, especially broad spectrum
- ●Reintubation or prolonged intubation
- ●Mechanical ventilation for acute respiratory distress syndrome
- ●Frequent ventilator circuit changes
- ●Total opioid exposure
- ●Multiple trauma
- ●Paralysis
- ●Number of central venous catheter placements and surgeries
- ●Use of muscle relaxants or glucocorticoids
- ●Malnutrition, chronic renal failure, anemia, Charlson comorbidity index, previous hospitalization

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Major article

Risk factors for hospital-acquired pneumonia outside the intensive care unit: A case-control study

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Key Words:
Nosocomial pneumonia
Outcome

Background: Hospital-acquired pneumonia (HAP) is one of the leading nosocomial infections and is associated with high morbidity and mortality. Numerous studies on HAP have been performed in intensive care units (ICUs), whereas very few have focused on patients in general wards. This study examined the incidence of, risk factors for, and outcomes of HAP outside the ICU.

Methods: An incident case-control study was conducted in a 600-bed hospital between January 2006 and April 2008. Each case of HAP was randomly matched with 2 paired controls. Data on risk factors, patient characteristics, and outcomes were collected.

Results: The study group comprised 119 patients with HAP and 238 controls. The incidence of HAP outside the ICU was 2.45 cases per 1,000 discharges. Multivariate analysis identified malnutrition, chronic renal failure, anemia, depression of consciousness, Charlson comorbidity index ≥ 3, previous hospitalization, and thoracic surgery as significant risk factors for HAP. Complications occurred in 57.1% patients. The mortality attributed to HAP was 27.7%.

Conclusions: HAP outside the ICU prevailed in patients with malnutrition, chronic renal failure, anemia, depression of consciousness, comorbidity, recent hospitalization, and thoracic surgery. HAP in general wards carries an elevated morbidity and mortality and is associated with increased length of hospital stay and increased rate of discharge to a skilled nursing facility.

intrinsic risk factors

- **chronic lung disease** (39.5% vs 27.3%; P ¼.01)
- **depression of consciousness** (30.3% vs 13%; P < .001)
- **chronic renal failure** (25.2% vs 10.5%; P < .001)
- **malnutrition** (23.5% vs 7.1%; P < .001)
- **anemia** (59.7% vs 33.6%;P <.001)
- **Charlson comorbidity index 3** (63.9% vs 45.1%; P ¼.001)
- **previous nosocomial infection** (12.6% vs 4.6%; P ¼ .009).

Differences in the following intrinsic risk factors between cases and controls did not achieve statistical significance:

- cigarette smoking (19.3% vs 12.2%; P ¼ .07),
- alcohol abuse (11.8% vs 7.1%)
- Neoplasm (44.5% vs 36.1%; P ¼ .08)
- diabetes (29.4% vs 38.2%)
- chronic heart disease (17.6% vs 15.5%)
- obesity (9.2% vs 6.3%)
- liver cirrhosis (6.7% vs 7.1%)
- HIV infection (2.5% vs 2.1%)
- neutropenia (2.5% vs 2.1%)
- fatal or ultimately fatal underlying disease (64.6% vs 57.1%).

extrinsic risk factors

- Nebulization (31.9% vs 20.2%; P ¼.009)
- previous endotracheal intubation (30.3% vs 22.3%; P ¼ .03)
- thoracic surgery (10.9% vs 4.2%; P ¼ .008)
- blood transfusion (24.3% vs 13.9%; P ¼ .01)
- hospital admission in the previous month (21% vs 9.7; P ¼.003)
- previous ICU admission (9.3% vs 4.2%; P ¼ .03).

Differences in the following extrinsic risk factors did not achieve statistical significance:

- nasogastric intubation (16.8% vs 10.9%; P ¼ .08) antibiotic therapy (52.1% vs 44.1%)
- antacid therapy (76.5% vs 82.8%)
- tracheotomy (3.4% vs 0.8%)
- corticosteroids(26.1% vs 26.5%)
- chemotherapy (9.2% vs 8.8%)
- radiotherapy (3.4% vs 2.1%)
- and previous surgery (35.3% vs 30.3%) including abdominal surgery (14.3% vs 13%) and head/neck surgery (4.2% vs 4.6%).

- ***The independent risk factors associated with HAP on multivariate logistic regression analysis were***
- malnutrition
- chronic renal failure
- anemia
- depressed consciousness
- Charlson comorbidity index 3
- hospital admission in the previous month
- and thoracic surgery

Table 1. Charlson Comorbidity Index Scoring System

Score	Condition
1	Myocardial infarction (history, not ECG changes only)
	Congestive heart failure
	Peripheral vascular disease (includes aortic aneurysm ≥6 cm)
	Cerebrovascular disease: CVA with mild or no residua or TIA
	Dementia
	Chronic pulmonary disease
	Connective tissue disease
	Peptic ulcer disease
	Mild liver disease (without portal hypertension, includes chronic hepatitis)
	Diabetes without end-organ damage (excludes diet-controlled alone)
2	Hemiplegia
	Moderate or severe renal disease
	Diabetes with end-organ damage (retinopathy, neuropathy, nephropathy, or brittle diabetes)
	Tumor without metastases (exclude if >5 y from diagnosis)
	Leukemia (acute or chronic)
	Lymphoma
3	Moderate or severe liver disease
6	Metastatic solid tumor
	AIDS (not just HIV positive)

NOTE. For each decade > 40 years of age, a score of 1 is added to the above score.

Abbreviations: ECG, electrocardiogram; CVA, cerebrovascular accident; TIA, transient ischemic attack; AIDS, acquired immunodeficiency syndrome; HIV, human immunodeficiency virus.

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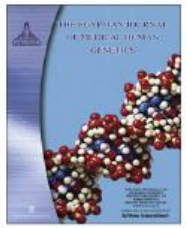

ORIGINAL ARTICLE

Hospital-acquired pneumonia in critically ill children: Incidence, risk factors, outcome and diagnosis with insight on the novel diagnostic technique of multiplex polymerase chain reaction

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KEYWORDS

m-PCR;
Hospital-acquired pneumonia;
Bacterial diagnosis;
Risk factors;
Outcome

Abstract Hospital-acquired pneumonia (HAP) is the most frequent hospital-acquired infection in critically ill patients. National Nosocomial Infections Surveillance (NNIS) system reported that HAP accounts for as much as 31% of all nosocomial infections acquired in medical intensive care units (ICU). The increasing incidence of infections caused by antibiotic-resistant pathogens contributes to a high mortality rate, longer ICU stay and higher costs. In this study, we aimed to identify the incidence of HAP, the associated risk factors, and its effect on outcome. We evaluated as well the usefulness of multiplex polymerase chain reaction (m-PCR) as a novel tool for emergency diagnosis of HAP.

We examined all consecutive admissions to Pediatric ICU from February 2010 to August 2010.

Table 3 Risk factors for hospital-associated pneumonia.

Risk factor	Odds ratio (OR)	95% CI*	*p*-Value
Mechanical ventilation	10	3.2–30	<0.001
Re-intubation	8.7	2.3–31.5	<0.001
Sedation	4.3	1.6–11.7	<0.01
Nasogastric feeding	7.1	2.6–19.6	<0.001
Central venous catheter (CVC)	0.67	0.27–1.7	0.4
GERD	10.3	3.1–33.6	<0.001
H_2 blockers	9.6	2.14–45.3	<0.001

* 95% CI = 95% Confidence Interval.

Table 4 Summary of m-PCR and bacterial culture results in endotracheal aspirate (ETA) and blood samples.

Variable	ETA (n = 25)			Blood samples (n = 25)		
	m-PCR	Culture	*p*	m-PCR	Culture	*p*
Positive cases, *n* (%)	19 (76%)	6 (24%)	<0.001	17 (68%)	2 (8%)	<0.001
Streptococcus pneumoniae	2 (8%)	–	<0.16	–	–	<1.00
Methicillin-resistant *Staphylococcus* (MRSA)	6 (24%)	–	<0.01	2 (8%)	–	<0.16
Klebsiella pneumoniae	10 (40%)	5 (20%)	0.03	10 (40%)	1 (4%)	<0.003
Mycoplasma pneumoniae	6 (24%)	–	<0.01	5 (20%)	–	0.03
Chlamydia pneumoniae	1 (4%)	–	0.3	1 (4%)	–	0.32
Pseudomonas aeruginosa	–	2 (8%)	0.16	–	1 (4%)	0.32
Legionella pneumophilia	–	–		–	–	
Acinetobacter#	–	7 (28%)	–	–	4 (16%)	–
Acinetobacter# nd MRSA	–	–	–	–	1 (4%)	–
Klebsiella pneumoniae and *Pseudomonas aeruginosa*	–	1 (4%)	–	–	–	–

Acinetobacter is not involved in the m-PCR panel.

of MRSA, *K. pneumonia*, *Streptococcus pneumoniae* and *M. pneumoniae*. Polymicrobial pneumonia was diagnosed in two patients, where a combined growth of MRSA and *Acinetobacter* was present in one patient and combined growth of *P. aeruginosa* and *K.* pneumonia in another patient.

4. Discussion

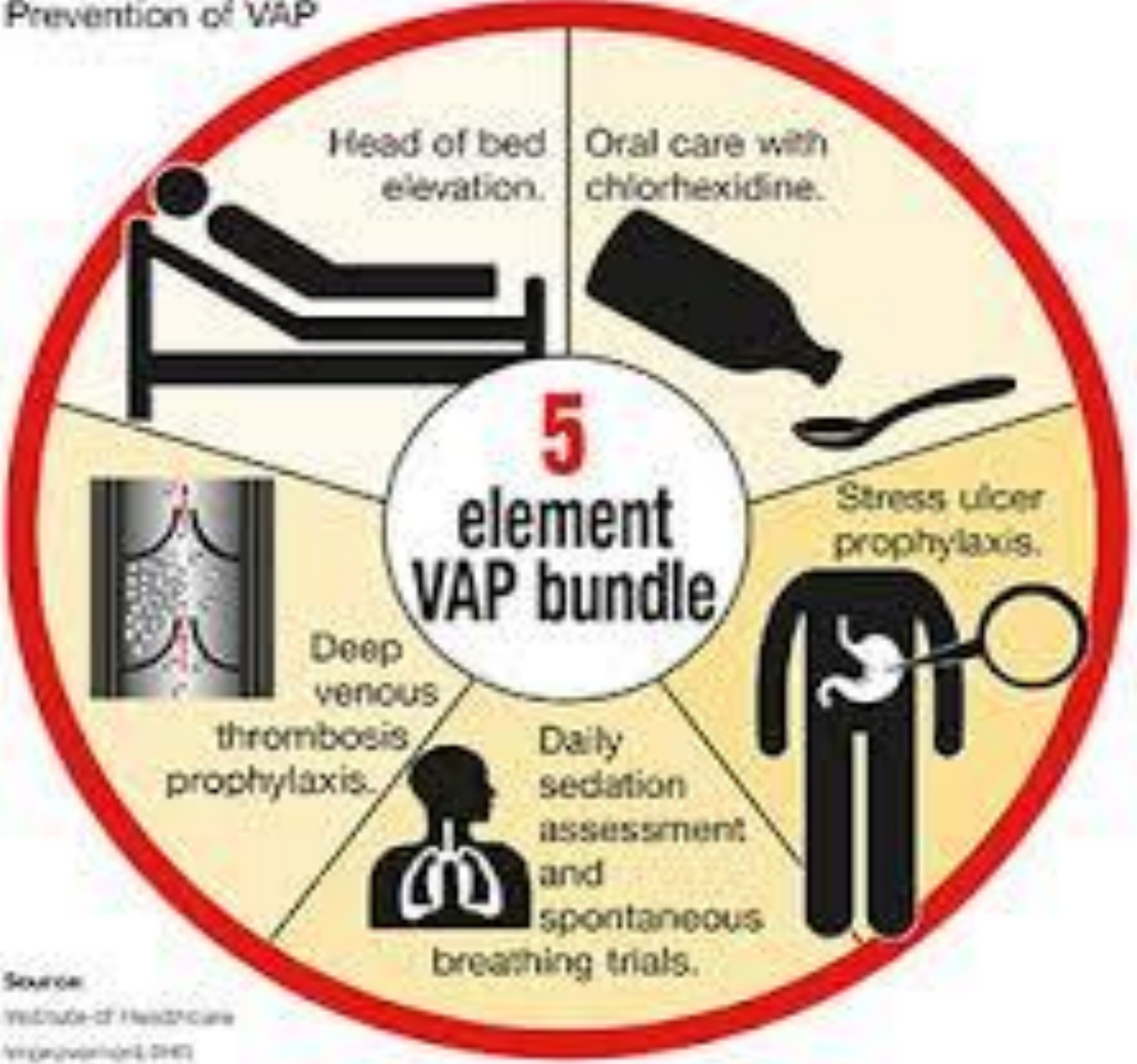
Both developed and resource-poor countries are faced with the burden of health care-associated infections. In a World Health Organization (WHO) cooperative study involving 55 hospitals

with *Pseudomonas* contributing to 57.1% of deaths followed by *Klebsiella*, *Escherichia* coli and *Acinetobacter*. The increasing incidence of infections caused by antibiotic-resistant pathogens contributes to the emerging seriousness of these infections with expected higher mortality rate. Numerous studies have demonstrated that severe underlying illness predisposes patients in the ICU to the development of pneumonia and contribute to the associated high mortality rates [14].

In our study; the mean length of stay was doubled following HAP together with 50% increment in the mean duration of mechanical ventilation days. In another study, HAP lengthens the hospital stay by 7–9 days and is associated with a higher

- Although there are geographic differences, data from previous epidemiologic studies on HAP patients suggests that multidrug-resistant organisms are on the rise

Prevention of VAP



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