A STUDY OF COMMON INFECTIONS ENCOUNTERED IN A GERIATRIC EXTENDED CARE HOSPITAL

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Summary
Older patients are generally at high risk of developing infections. Study was done to determine the prevalence, risk factors, types of infection, and pattern of antibiotic usage in elderly patients. Data collection was done by 5 Infection Control Nurses from 219 patients during a one-day study of a Geriatric extended care hospital. The presence of hospital acquired infection (HAI) was determined by the criteria defined by the Center for Disease Control (CDC), Atlanta, Georgia, USA. Results showed that infections were present in 27.4% of patients. The prevalence of HAI was 8.7%. Most patients (91.1%) with infection were on antibiotic treatment. Univariate analysis showed that staying in Geriatric and Infirmary units, use of IV catheter and antibiotics (within 28 days) prior to HAI were significant risk factors for HAI. However, stepwise logistic regression revealed that only the use of IV catheter and use of antibiotics within 28 days were independent predictors for HAI. This study demonstrated an easy and inexpensive way to measure the total infections as well as HAIs in an extended care hospital by using the prevalence survey method. Large scale prospective studies are recommended in future to further evaluate the cost-effectiveness of prevalence surveillance for infection both globally and locally.

Keywords: Hospital acquired infection, elderly

Introduction
Ageing is an important risk factor for infectious diseases to develop. The reasons for this are complex and multifactorial. The presence of multiple medical problems, nutritional deficiency, regression of the immunity and defense mechanism all contribute to the susceptibility of older people to develop infectious diseases. Infection is an important cause of morbidity and mortality in older patients. It also prolongs hospital stay and increases health care costs. Hitherto, studies performed in Hong Kong which examined the prevalence of infectious diseases among older people were mainly carried out in acute hospital setting. The prevalence and the risk factors of infections among older patients in the extended care setting were not known locally. Studies performed in Western countries show that prevalence surveillance is a rapid and inexpensive way to estimate the magnitude of infection related-problems in hospitals. In addition, regular infection prevalence surveillance in parallel with effective infection control programmes can reduce hospital acquired infection (HAI). The objectives of this study are to determine the prevalence and types of infections, pattern of antibiotic usage in older patients, as well as to identify risk factors for HAI.

Methods
The study was carried out in a geriatric extended care hospital with 296 beds composing of Geriatric (104 beds), Orthopaedic (112 beds) and Infirmary Units (80 beds). The patients in Geriatric and Orthopaedic wards were transferred to the extended care hospital from an acute university hospital for rehabilitation and convalescent care. All patients within the hospital at 0800h on 26 June 1998 were included in this study. A prevalence study design was used. The presence of hospital acquired infection (HAI) was determined by the “Center for Disease Control (CDC) Definition of Nosocomial Infections”. HAI was defined as infections acquired and developed totally in the extended care hospital. Infections incubating at the time of admission and presenting within 48 hours of admission were considered to be infection from other hospitals (IOH).
The surveillance was carried out by five Infection Control Nurses (ICNs) who also performed data collection. Patients’ case notes and investigation results were used to assist in deciding if the patient were suffering from infection and if so, whether they had HAIs or IOHs. Clinical finding, results of laboratory and radiological investigations as well as the use of antibiotic therapy were recorded by ICNs to determine whether the patients were suffering from infectious diseases. HAI was determined by the criteria of CDC definitions of nosocomial infections. The following variables were recorded for all patients: demographic data, principle diagnoses and present antibiotic therapy. To study the potential risk factors on HAI, additional information was gathered. This included duration of stay in hospital, Barthel Index (20), urinary and faecal continence status, mental status, use of invasive devices prior to HAI, skin integrity, mobility status and use of antibiotic in the previous 28 days. The abovementioned risk factors have been used to study HAI in previous studies1,9,12,13.

Statistical Package for the Social Science (SPSS) version 10.0 was used to analyze the data. The Chi-squared test and Fisher’s Exact test were used to compare categorical variables. Independent t-test was used when appropriate to compare means between two samples. Stepwise Logistic Regression was used to determine the independent risk factors for HAI. Statistical significance was accepted when \( p<0.05 \)

Results

A total of 219 in-patients were studied. The
Table 3. Stepwise logistic regression analysis for potential risk factors of HAI

<table>
<thead>
<tr>
<th>Potential risk factors</th>
<th>Adjusted Odd Ratio (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of IV catheter</td>
<td>0.14 (0.02-0.82)</td>
<td>(P=0.029^*)</td>
</tr>
<tr>
<td>Use of antibiotic within 28 days</td>
<td>0.12 (0.03-0.44)</td>
<td>(P=0.001^*)</td>
</tr>
</tbody>
</table>

* Statistically Significant

Table 2. Types of infection identified

<table>
<thead>
<tr>
<th>Type of infection</th>
<th>All Infections*</th>
<th>HAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia/Chest infection</td>
<td>16 (26.7)</td>
<td>6 (31.6)</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>11 (18.3)</td>
<td>3 (15.8)</td>
</tr>
<tr>
<td>Skin</td>
<td>9 (15)</td>
<td>1 (5.3)</td>
</tr>
<tr>
<td>Clinical sepsis</td>
<td>8 (13.3)</td>
<td>5 (26.3)</td>
</tr>
<tr>
<td>Fungal</td>
<td>6 (10)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Asymptomatic bacteriuria</td>
<td>3 (5)</td>
<td>3 (15.8)</td>
</tr>
<tr>
<td>Wound</td>
<td>3 (5)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Conjunctivitis</td>
<td>2 (3.3)</td>
<td>1 (5.3)</td>
</tr>
<tr>
<td>Septic arthritis</td>
<td>2 (3.3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Total</td>
<td>60 (100)</td>
<td>19 (100)</td>
</tr>
</tbody>
</table>

*Results are expressed as Number (%)
explanation for the association of IV catheters and HAI was that the use of IV catheter was itself the cause of HAIs such as those with skin infection or labeled as clinical sepsis in the study. This served to remind clinicians and health care workers the importance of strict aseptic technique in inserting IV catheters as well as regular IV site inspection and rotation for prevention of HAI. Unfortunately, it was not possible to delineate whether the use of IV catheters was just an association or itself a cause for the HAI basing on the finding of the present study. The use of antibiotics within 28 days prior to HAI was another independent risk factor for HAI. This suggested that there were more infections requiring antibiotics treatment prior to HAI. It was likely that these patients were frail and were prone to multiple infections. This alerted clinicians that older patients with repeated sepsis would be prone to have HAI and judicious measures should be applied to prevent the HAI development.

Previous studies showed that clinical units were related to the development of HAI\textsuperscript{19}. Although Geriatric and Infirmary units were associated with HAI in the present study, stepwise logistic regression analysis did not showed that clinical units were independent predictors for HAI. Other potential risk factors such as age, mobility state, Barthel Index, mental status and use of Foley catheter were also not significantly associated with HAI. This could be due to the relative small sample size in the present prevalence survey. The number of cases with HAI (n=19) was only one-tenth of those with no HAI (n=200). Large scale incidence survey with larger sample size is recommended to identify the risk factors for HAI more accurately. Another limitation of this study was that infection in the elderly could be difficult to diagnose. Even common infections might present atypically\textsuperscript{1,3,5,7}. This might lead to under-diagnosis of the prevalence of total infections in the sample. Another practical limitation was that not all cases with infection had microbiology reports available. Without these reports, HAI could not be confirmed according to the CDC criteria. Indeed it had been suggested by Hussain et al and Beaujean et al that revision of the CDC criteria might be needed so that it could be applied to the older population\textsuperscript{1,3}.

In conclusion, this study demonstrated an easy and inexpensive way to measure the total infections as well as HAIs in a long-term care hospital by using the prevalence survey method. The data from the survey provided valuable information about the pattern of infection, antibiotic usage and the independent risk factors of HAI. Incidence survey with large sample size is required to accurately identify the risk factors for HAI. In addition, large scale prospective studies are recommended in future to further evaluate the cost-effectiveness of prevalence surveillance for infection both globally and locally.

References:


Acknowledgement:
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Learning Points
(1) The point prevalence of infection in the studied hospital was 7.4%.
(2) Among the infections, 34.5% were hospital acquired infection.
(3) Use of intravenous line and prior antibiotics used within 28 days were independent risk factors for hospital acquired infection.

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Application
a) Forms and relevant materials are obtainable either in person or by postal request from Miss H Mok, 9/F Dept of Medicine & Therapeutics, Prince of Wales Hospital, Shatin, N.T. (For postal requests, please enclose a stamped ($3.50) self-addressed A4 size envelope)
b) Fee: HK$180
c) Deadline of application: 30 June 2004

An information seminar will be held on 12th May 2004 (Wed) at Seminar Room 1, 1/F School of Public Health, Prince of Wales Hospital at 7 p.m. For further enquiries, please contact Ms Yeung/Miss Mok from 2 p.m. to 5 p.m. (Monday to Friday) at 26323128 or hazelmok@cuhk.edu.hk