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BATOOL SHARIFI-MOOD

MALIHEH METANAT

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Spectrum of Clinical Infectious Diseases in Hospitalized Elderly Patients in the Southeast of Iran

Batool SHARIFI-MOOD
Maliheh METANAT

Research Center for Infectious
Diseases and Tropical Medicine,
Zahedan University of Medical
Sciences, Boo-Ali Hospital,
Zahedan - IRAN

Aim: The elderly have defective host defenses that compromise their ability to ward off infectious agents; factors influencing immunocompetence include impaired host defenses such as diminished cell-mediated immunity, changes in chronic diseases, medications, malnutrition and functional impairments. This study was conducted in order to determine the pattern of clinical infectious diseases in a series of hospitalized elderly patients.

Materials and Methods: In this cross-sectional study, all elderly patients who were admitted to our hospital in Zahedan (Southeast Iran) between 2001 and 2006 were evaluated. We retrospectively reviewed the 1278 patients for diagnostic studies, risk factors, treatment options and morbidity and mortality rate.

Results: Tuberculosis (TB) was the commonest infection (46%), followed by pneumonia (14.9%), bronchitis (13%), gastroenteritis (6.5%) and sepsis (3.9%). Most of the cases of TB were pulmonary (98.2%). Pulmonary aspergillosis was seen in only one case and was the least common infection in our patients (0.07%). Diabetes was seen as a risk factor in 4.3% of our patients. Six patients (0.4%) died during hospital stay due to myocardial infarction.

Conclusions: Based on the results from this study, TB and bronchopulmonary infections are the most common infections in hospitalized elderly patients in the Southeast of Iran. Influenza and pneumococcal vaccines can limit the bronchopulmonary infections in this group.

Key Words: Infection, elderly patients, clinical diseases, tuberculosis

Güney Doğu Iran'da Hastanede Yatan Yaşlı Hastalarda İnfeksiyöz Hastalık Spektrumu

Amaç: Yaşlılar hücresel bağışıklıktaki azalma, kronik hastalıklar, kullanılan ilaçlar malnütrisyon ve fonksiyonel yetersizlikler nedeniyle bozulan defans mekanizmaları sonucunda enfeksiyöz ajanlara karşı dayanıksızdır. Bu çalışma, hastaneye yatırılmış bir grup yaşlı hastada görülen enfeksiyöz hastalık tipi ve sıklığını saptamak için yapılmıştır.

Yöntem ve Gereç: Bu kesitsel çalışma, Zahedan(Güneydoğu İran) daki hastanemize 2001-2006 yılları arasında yatırılan yaşlı hastalarda yapılmıştır. 1278 hastanın tanıları, risk faktörleri, tedavi seçenekleri, morbidite ve mortalite oranları retrospektif olarak araştırılmıştır.

Bulgular: Tüberküloz(TB) en sık görülen enfeksiyon olup (%46) onu pömoni (%14.9), bronşit (%13), gastroenterit (%6.5) ve sepsis (%3.9) izlemiştir. TB olgularının çoğu (%98.2) akciğer tüberkülozudur. En az görülen enfeksiyon pulmoner aspergilozis olup sadece bir olguda görülmüştür (%0.07). Diyabet olguların %4.3'ünde risk faktörü olarak karşımıza çıkmıştır. 6 hasta(%0.4) myokard enfarktüsü nedeniyle hastanede kaldığı sürede kaybedilmiştir.

Sonuç: Bizim bulgularımıza göre güneydoğu İranda hastanede yatan yaşlı hastalarda TB ve bronkopulmoner enfeksiyonlar en sık görülen enfeksiyonlardır. Influenza ve pnömokok aşılı bu grupta enfeksiyon sıklığını azaltabilir..

Anahtar Sözcükler: İnfeksiyon, yaşlı hasta, hastalık, tüberküloz

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Correspondence

Batool SHARIFI-MOOD
Research Center for Infectious
Diseases and Tropical Medicine,
Boo-Ali Hospital, Zahedan
University of Medical Sciences,
Zahedan – IRAN

batoolsharifi@yahoo.com

Introduction

The term geriatric refers to the aging human population, and geriatrics refers to the medical field that deals with clinical problems specific to old age and the aging (1). The increasing number of persons >65 years of age form a special population at risk for community-acquired and nosocomial infections (1,2). In 1900, only 1% of the earth's population (15 million persons) was >65 years of age. By 1992, 6% of the global population, or 342 million persons, were in this category. By the year 2050, these figures will have risen to 20% and 2.5 billion, respectively (3). The vulnerability of this age group is related to impaired host defenses such as diminished cell-mediated immunity (2-3). T-lymphocyte production and proliferation decline with age, resulting in decreased cell-mediated immunity and decreased antibody production to new antigens (3-4). Lifestyle considerations, e.g., travel, living arrangements and residence in nursing homes, can further complicate the clinical picture (3-6). The magnitude and diversity of health care-associated infections in the aging population are generating new arenas for prevention and control efforts (1). Many studies have been reported from different populations in the world (7-12). All of these reports show that the geriatric population is at increased risk for infections secondary to the age-related decline of the immune system (7-12). Tuberculosis (TB) is the most commonly reported disease in persons over 65 years of age (3). In 1995, 23% of reported TB cases in the United States occurred in this age group (11). Diagnosing infection in elderly patients can be challenging because they may not display classic signs and symptoms (1-3). Fever and leukocytosis, two major indicators of infection, manifest less frequently or not at all in elderly patients due to their body's inability to mount an immune response (3,4,13). In view of the lack of data regarding the most common infections in our elderly patients, we decided to determine the clinical forms of infectious diseases in hospitalized patients.

Materials and Methods

We retrospectively reviewed a series of elderly patients who were admitted to infectious wards in Boo-Ali hospital, during a period of five years, from November 2001 to May 2006. Boo-Ali hospital is a teaching hospital in Zahedan in Sistan and Baluchistan province (in the Southeast of Iran) and is a referral center for infectious diseases. We first selected the 1278 patients who were more than 65 years of age. All patient files were then reviewed retrospectively for diagnostic studies, risk factors, treatment options, and morbidity and mortality rates.

Results

Out of 1278 cases (788 male, 490 female; mean age 69 years; age range 65-102 years), 598 cases (46%) were treated for TB. Pulmonary TB was the most common manifestation of TB in hospitalized elderly patients (98.2%). Forty-eight percent of cases with pulmonary TB had smear-positive pulmonary TB. In fact, TB was the most common infection in hospitalized elderly patients. Pneumonia (14.9%), bronchitis (12%), gastroenteritis (6.5%) and sepsis (3.9%) were the other common causes for hospitalization of elderly patients. Pulmonary aspergillosis was seen in only one case and was the least common infection in our patients. Six patients (0.4%) died during hospital stay due to myocardial infarction. All patients had received treatment according to the clinical diseases. Diabetes was seen as a risk factor in 4.3% of our patients. Eighteen cases (1.4%) had malignant disorders (bronchogenic carcinoma, n:7; hepatoma, n:3; lymphoma, n:6; and colonic carcinoma, n:2). Frequency of the different TB types and the causes of hospitalization of elderly patients are shown in Tables 1 and 2.

Table 1. Frequency of tuberculosis according to sex and TB type.

Disease Sex	Pulmonary	Pericarditis	Pott's	Miliary	Meningitis	Pleuritis	Total
Male	356	1	2	1	0	16	376
Female	208	1	0	1	1	11	222
Total	564	2	2	2	1	27	598

Table 2. Frequency of clinical diseases in hospitalized elderly patients.

Disease	Male		Female		Number	%
	No	%	No	%		
Tuberculosis	376	29.4	222	17.3	598	46
Pneumonia	140	10.9	51	3.9	191	14.9
Bronchitis	108	8.4	62	4.8	170	13
Gastroenteritis	49	3.8	35	2.7	84	6.5
Sepsis	29	2.2	21	1.6	50	3.9
UTI	18	1.4	20	1.5	38	2.9
CCHF	8	0.6	0	0	8	0.6
Asthma	22	1.7	12	0.8	34	2.6
Malignancy	12	0.8	6	0.4	18	1.4
Meningitis	6	0.4	2	0.1	8	0.6
Varicella-Zoster	2	0.1	4	0.3	6	0.4
Cellulitis	4	0.3	4	0.3	8	0.6
Hepatitis	15	1.1	8	0.6	23	1.7
Arthritis	6	0.4	2	0.1	8	0.6
Pulmonary abscess	15	1.2	14	1.09	29	2.2
Cirrhosis	3	0.17	1	0.07	4	0.3
Pulmonary aspergillosis	1	0.07	0	0	1	0.07
Total	814	63	464	36	1278	100

UTI: Urinary tract infection. CCHF: Crimean-Congo haemorrhagic fever.

Discussion

Our results showed that the geriatric population is susceptible to infection and that infection is a frequent cause of hospitalization in elderly people. TB and bronchopulmonary infection were the major causes for hospitalization in our patients. It is better to know that TB is an endemic disease in this region of Iran. Annual incidence rates for TB and smear-positive pulmonary TB in Zahedan are 70 and 41 per 100,000 total population, respectively (14). Forty-six percent of our patients had pulmonary TB and 48% of cases with pulmonary TB had smear-positive pulmonary TB. In Chan-Yeung's study (15), in Hong Kong, the estimated prevalence rate of active TB in the geriatric population in old age homes was 669 per 100,000, significantly higher in men than in women (1,101 per 100,000 vs 530 per 100,000). In the United States study, 23% of reported cases of TB occurred in elderly patients (11). TB is the most

commonly reported disease in persons 65 years of age (3).

Heppner (16) showed that the most common cause of fever in the geriatric population was infection. The most important infections in the elderly are caused by bacteria (16,17). Incidence and bacterial spectrum depend on the site of infection and whether the patient is hospitalized, or living in a nursing home or in the community (17). A study by Swanink et al. (17) showed that the principle infections are bronchopulmonary and urinary infections, but severe complications specifically related to age are also possible, notably meningitis, TB, herpes zoster and septicemia (18). In the present study, pulmonary infection was a major cause for hospitalization in elderly patients. Sepsis, meningitis and herpes zoster accounted for 3.9%, 0.6% and 0.4% of clinical infectious diseases in our patients, respectively.

Although infections are a frequent cause of hospitalization in elderly people, hospitalization, on the other hand, is a risk factor for life-threatening nosocomial infections caused by invasive diagnostic procedures and frequent use of urinary and venous catheters (19).

Infections in the elderly are often accompanied by serious complications as bacteriemia (pneumonia), recurrent urinary tract infection (UTI), and severe disability (pressure ulcer infections) (13,19). Because of these serious and frequent complications, mortality of infections is higher in older versus younger patients (19).

The incidence of infection and associated mortality increases with age. Infectious diseases represent the third cause of mortality in patients aged over 65 (15). A study by Torres et al. (18) determined that case fatality rate in community-acquired pneumonia in elderly patients was 6%. Mortality rate in our patients was 0.4%. All deaths were due to myocardial infarction. Pneumonia, UTI and pressure ulcer infections are more frequent in patients living in nursing homes than in community-dwelling older people (20). Our study showed that only 2.9% of elderly patients were hospitalized due to UTI.

In Weidner's study (21), an increasing incidence of asymptomatic bacteriuria and symptomatic UTI in the elderly patients was reported. Specific age-related diseases such as diabetes mellitus and changes in the

vaginal colonization and urologic disorders require increasingly demanding therapeutic strategies (21). Diabetes was seen as a risk factor in 4.3% of our patients. All diabetic patients had pulmonary TB. Other previous studies showed that bronchopulmonary and urinary infections are the common infections in the elderly (3,19-21). Since in our study, bronchopulmonary infection was one of the most common infections in hospitalized elderly patients and influenza and pneumococcal vaccines have demonstrated their efficacy in limiting bronchopulmonary infections in these patients, vaccination is therefore advised for the geriatric population.

In conclusion, the geriatric population is susceptible to nosocomial and community-acquired infections, and infections are a frequent cause of hospitalization in elderly people. Our findings show that TB is the most common infection in hospitalized elderly patients in the Southeast of Iran. Furthermore, among infections, bronchopulmonary infection is a major cause for hospitalization. Influenza and pneumococcal vaccines can limit bronchopulmonary infection in the geriatric population.

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