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Volume 3, Issue 2 September 2006

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Editorial

Author

Dr Abdulrazak Abyad

Chief editor

This is the second issue of the journal this year. This issue has a number of research papers from the region. All the papers in this issue are research papers we would like to encourage the readers to submit review papers and clinical cases.

A paper from Sultanate of Oman explore the economic impact of treating geriatric hip fracture. The author pointed that hip Fractures in Geriatric Population is on rise in Oman with need for increased number of hip fracture beds and this has heavy impact on the health service resources. The authors studied 150 patients who were admitted with a hip fracture to Rustaq Hospital. The mean total hospital expenditure per patient was found to be RO 1010.6 of which ward costs contributed 60 percent, operative costs 21 percent and investigations 19 percent. The conclusion was that these results have shown growing Economic Impact arising from the inpatient treatment of Acute hip fractures.

A paper from Iran evaluated the infectious etiologies of hospitalization in elderly
The medical Records of 667 hospitalized elderly patients (>65 year old) were reviewed retrospectively . Review revealed that respiratory tract infections (RTIs) were the most common cause of admission in infectious wards. In addition the study revealed that infectious wards are mostly crowded in summer and fall. These results mandate special care for prevention of respiratory tract infections. Dr Nooritajer M et al studied the relationship between depression with educational level, retirement and chronic diseases. This study was a cross- sectional study in which geriatric depression scale (GDS) was used. It was shown that nearly half of the elderly men have depression at the middle and sever status, so recognizing their problems and diseases is important for making the proper plans and interventions.

Dr Namazi H studied the factors that influence the outcome of carpal tunnel. He administered a questionnaire to 57 patients (83 hands) over 60 years of age who had carpal tunnel decompression. In all patients preoperative nerve conduction studies scored by the grading system from 1 to 6. Seventy percent had marked to severe neurophysiologic changes (grade 4-6). The mean postsurgical symptom severity score was 1.47. There was a significant relationship between presurgical nerve conduction grade and postsurgical symptom severity score. Conclusion: Elderly patients have low postsurgical symptom scores and have good satisfaction level after decompression.

Dr Kamrani et al, A investigate the discriminative value of two functional assessment scales (Berg Balance Test and Tinetti Balance Scale) for predicting falls in institutionalized elderly people. The sample size of the study was small including fifty four subjects, 17 fallers and 37 non-fallers. The results of the study indicated much more discriminative value for Berg balance test scores than Tinetti.

We look forward to receive your contribution for the coming issue on Dec 2006.

Sincerely,

A. Abyad, MD, MPH, MBA, AGSF , AFCHSE

Original Contribution/Clinical Investigation

The discriminative value of two functional assessment scales compared for predicting falls in institutionalized elderly people in Iran

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ABSTRACT

Background: The purpose of the present study is to compare the discriminative values of two clinical assessments methods (Berg Balance Test and Tinetti Balance Scale) to identify fallers among institutionalized elderly people with/without history of falling in an elderly population in Iran.

Methods: Fifty-four subjects, 17 fallers and 37 non-fallers were evaluated throughout this study. The frequency of falls within 6 months was prospectively studied. At the end of 6 months, those having had two or more falls were enrolled in the faller group and those having no falls were enrolled in the non-faller group and then the Berg balance test

and Tinetti Scale were administered for all participants in both groups.

Results: Independent t-test indicated a significant difference between the two groups of fallers and non-fallers in the mean scores on Berg Balance Scale ($P=0.0001$) and Tinetti Scale ($P=0.0001$). The results indicated much more discriminative value for Berg balance test scores than Tinetti.

Conclusions: This study demonstrates that the Berg Balance Scale assessment method is of more discriminative validity in differentiating those elderly people with history of fall from those without such history. Results from the following study would seem rather valuable as an assessment tool for health care professionals in the identification and monitoring of potential fallers within the elderly community.

Keywords: elderly, fall, Berg balance test, Tinetti scale.

Introduction

Decreased mortality and increased life expectancy has led to enlargement of the population of the elderly. At the beginning of 2000, the population of people older than 65 comprised one-eighth of the world's total population, i.e. 750 million people [1]. In light of this increase, health care professionals must address several problems occurring within this particular population. One of the most important and common problems is related to falls [2].

In 1998 the National Institute of Health reported, among Americans age 65 and older, fall-related injuries are the leading cause of death due to unintentional injuries [3]. The studies demonstrate that 25-47% of the elderly in the community have one or more falls per year and this even reaches 50% among those institutionalized. [1, 4]

Approximately in 5-20% of older persons who fall, the injuries suffered caused serious problems or death, and the psychological effects can lead to impaired mobility, loss of function, and an overall decrease in a person's quality of life [5]. The population lifetime cost of injuries associated with falls averages \$12.6 billion, and the average hospital charge for fall related injuries in an older adult is \$11,800 [6].

Fall prevention has, therefore been recognized as a priority area for research and intervention [7]. Many studies have reported several factors that have been found to be rather successful in the prediction of falls [8]. The most important of these factors include aging, chronic illness, sedentary lifestyle [9], orthopedic impairments, cardiac disorders [10], visual impairment [11], muscle weakness [12] and impaired balance [10]. Balance has been shown to be an important predictor of falls within the elderly population [13]. Balance is required for maintaining a static posture, stabilizing dynamic movements, performing daily activities, and moving around in the community [14]. Throughout the years, several instruments have been developed as a means of quantitatively measuring balance in the elderly population [8]. Several performance balance

measures, such as the timed up and go (TUG) [15], one-leg stand (OLS) [16], Activities-specific Balance Confidence (ABC) scale [17], Tinetti balance (TB) [18], and Berg balance test (BBT) [19], are available for evaluating community-dwelling older people but a standardized and valid screening instrument to identify people at risk of falling is still unavailable [20]. The Berg Balance test was designed to be an easy to administer, simple, safe and reasonably brief measurement of balance for elderly people [21]. The Tinetti balance scale (TB) is one part of the performance-oriented assessment of mobility problems [14] and this test is a simple clinical balance scale which measures characteristics associated with falls [20].

Some investigators have suggested that the BBT appears to be the best single predictor of fall status [22] and BBT have the best potential for detecting balance impairment [23]. Another study suggested that BBT is more appropriate for older people [20]. These suggestions were not justified by sufficient empirical evidence.

The purpose of the present study is to compare the discriminative values of these two clinical assessments methods (Berg Balance Test and Tinetti Balance Scale) to identify fallers among institutionalized elderly people with/without history of falling in an elderly population in Iran.

Methods

Study Subjects

Seventy elderly people institutionalized in the "Institute for the Elderly and Handicapped, Kahrizak, Tehran", independent in their daily activities and able to walk at least 10 meters with/without assistive devices volunteered to participate in this study after giving informed consent. Table 1 illustrates the descriptive statistics with regards to our study population. The participants were followed for 6 months, from September 2004 to March 2004, and the frequency of falls per month was registered by physio-

therapists through direct monthly visits to the participants and the care personnel.

At the end of 6 months, eight of the participants having fallen once within the period were excluded in order to increase the precision of the study (n1=8), four participants died (n2=4), two were hospitalized in the special care unit for injuries due to falls and diseases (n3=2), one had become wheelchair-bound (n4=1), and one was unable to walk (n5=1).

The subject pool was subsequently divided into two groups one of which consisted of 17 subjects and was categorized as fallers while the other group consisted of 37 non-fallers. Inclusion criteria for the faller's category consisted of two or more falls within the study period. A fall was defined as an "event which results in a person coming to rest inadvertently on the ground or other lower level and other than as a consequence of a violent blow, loss of consciousness or sudden onset of paralysis" [24].

Procedure and Measurements

At the end of 6-month follow-up, demographic characteristics and medical history of the participants including age, gender, weight, height, number of medicines per day and number of the diseases, were collected by interview and referring to their medical files.

Then, each participant was assessed by an investigator (blinded to the allocation of participants) using the two assessment methods according to the instructions.

In Berg Balance Scale, 14 activity items, including standing up from seated position, standing without support, sitting without support, sitting down, transfer, standing without support with the eyes closed, standing without support with the legs fixed together, bending forward with the arms stretched out, lifting an object off the ground, turning to the left and the right and looking back, turning 360 degrees, touching the stool with the legs for several times, standing without support with the feet along each other, and standing on a single leg, were measured according to the instructions.

Each activity item was scored as 0-4, where score of 0 meant inability to perform the item, and score of 4 meant complete ability to perform the item. The total score of this method was 56.

In Tinetti Scale method, the following activity items were measured according to the instructions:

- On balance: balance at sitting, standing up and effort to stand up, balance at immediate standing (the first 5 seconds), balance at standing and pushing, standing with the eyes closed, turning 360 degrees, and sitting down.
- On gait: starting to walk, length, height, symmetry and

succession of the steps, route, oscillation of the trunk, and width of gait.

Each activity item was scored 0-1 or 0-2, where a score of 0 meant inability to perform the item and a score of 1 or 2 meant complete ability to perform it. The score was 16 for the balance items and 12 for the gait items, and the total score was 28.

Statistical Analysis

Data analysis of the experimental data was made possible by means of the Statistical Package of Social Science (SPSS Inc., Chicago, IL) for Windows version 11.5. Student T test was used to test the statistical significance of mean differences between fallers and non-fallers with regards to weight, height, age, number of medicines per day, number of the diseases, total score of the Tinetti balance scale as well as the mean score of the total score of the Berg balance scale. Chi square test was used to find out if there's any difference in sex and use of assistive device between the two groups.

A backward Wald logistic regression was used in order to determine the best predictive model for falling in the elderly population. For this particular model, fall history was coded as 0 for non-fallers, 1 for fallers and was used as the dependent variable. A P-value of <0.05 was considered statistically significant.

Then, a cut-off score, the sensitivity and specificity of the best predictor for predicting fall during the year following its administration were calculated. A receiver operating characteristics (ROC) curve was constructed with these results. Finally, to make the best clinical decision, validity indices of the best predictor method, including positive and negative likelihood ratio were determined.

Results

Sixteen participants were lost at the end of follow up. The discriminative value of the two assessment methods (Tinetti Scale and Berg Balance Scale) was studied in 54 elderly divided to fallers and non-fallers.

There were no significant differences in sex, weight, height, number of the medicines and number of the diseases between fallers and non-fallers [Table 1]. Table 1 shows that the fallers had significantly lower Tinetti Scale and Berg Balance scores, higher age and more use of assistive device compared with non-fallers.

Table 1: Association of demographic characteristics and medical history with fall classification

Risk factor	Non fallers (n=37)	Fallers (n=17)	P value
Age factor X(mean) SD	73.32 7.72	80.53 8.11	0.003
Gender (%) Female Male	35 65	52.94 7.1	0.404
Weight (Kg) X(mean) SD	58.43 11.48	56.29 11.21	0.525
Height (Cm) X(mean) SD	156.51 8.40	154.06 10.50	0.261
Assistive device (%)	0	53	0.0001
No. of medications per day X(mean) SD	3.79 2.17	4.06 3.05	0.722
No. of diseases X(mean) SD	1.27 0.8	1.50 1.21	0.437
Berg Balance Scale X(mean) SD	51.46 4.25	39.29 5.07	0.0001
Tinetti Scale X(mean) SD	25.62 2.96	18.29 3.64	0.0001

A backward Wald logistic regression was performed in order to produce a model with the underlying purpose of predicting those individuals at risk of falling. In the logistic regression model, the predictors entered into the analysis were age, the total Berg balance score and the total Tinetti score. The logistic regression analysis showed that only the total Berg balance score contributed significantly to the prediction of falls ($P < 0.05$). Table 2 displays the regression coefficients (B), the standard errors, as well as the intercept (constant), for the significant predictor variables.

Table 2: Forward logistic regression of fall predictor variables on fall status in a geriatric population

Predictor variables	B	S.E	P. value
Age	1.15	0.95	0.14
Berg Balance Scale	0.48	0.36	0.04
Tinetti Scale	1.44	0.34	0.28

The result from the Berg Balance scale was further assessed in the hope of producing significant cut-off scores that will successfully classify those at risk of falling. With regards to the Berg balance scale, a cut-off of 46 and above was determined. With this value, sensitivity,

those with a history of fall (sensitivity) and specificity values, those who do not present a history of falling, are 94 and 86.5%, respectively.

The validity indices including the sensitivity, specificity, predictive value, and likelihood ratio of Berg Balance Scale are displayed in **Table 3** for each cut-off point.

Table 3: Validity indices of Berg Balance Scale according to different cut-off points

Cut off point	43	44	46	48
Sensitivity (%)	76.5 [76.30-76.70]	88.2 [88.05-88.35]	94.1 [93.99-94.12]	94.1 [93.99-94.12]
Specificity (%)	89.2 [89.10-89.30]	89.2 [89.10-89.30]	86.5 [86.39-86.61]	83.8 [83.68-83.92]
Likelihood ratio for a positive test	7.08	8.16	6.97	5.81
Likelihood ratio for a negative test	0.26	0.13	0.07	0.07

Discussion

There is no consistent evidence of effective interventions to prevent falls among hospital inpatients [25]. The purpose of the present study was to evaluate the several risk factors linked to the falling and to develop a model that can be used by the vast majority of health care professionals, with the hope of quantifying fall risk among elderly people and preventing this terrible occurrence in the aged.

This study also indicated that the frequency of use of assistive devices and mean age are more in the elderly individuals with history of falling than those without such history. Therefore, the risk of falling for an individual can be estimated according to use or nonuse of assistive devices and his or her age.

This study demonstrates that the fallers had significantly lower Tinetti Scale and Berg Balance scores than non-fallers but Berg Balance Scale assessment method is of more discriminative validity in differentiating those elderly people with history of fall from those without such history. This finding contradicts the findings of Riddle *et al* [21] and Thorbahn *et al* [10], and favors the findings of Shumway-Cook *et al* [22]. Among the causes of difference between the findings of this study and of other studies is the difference in properties of the subjects and their life environments.

Through further investigation of the Berg balance scale, we proceeded to the determination of a cut-off score that would be statistically successful in predicting elderly fallers from non-fallers. Previous studies have determined an inconsistent cut off point. Lajoie et al found that a cut-off score of 46 was statistically effective in predicting falls in the elderly community [8] and a cut-off of 49 was determined with a population of 44 community-dwelling older adults by Shumway-Cook *et al* [22]. In the present study, we found that a cut-off score of 46 was statistically effective in predicting falls in the elderly population and the sensitivity and specificity of classifying fallers and non-fallers with this cut-off of score is 94 and 86.5%, respectively.

Since therapists should make their clinical decisions according to the results of diagnostic tests and not those tests based on gold standard measures, some researchers believe that positive and negative predictive values are more beneficial than sensitivity and specificity. Unfortunately, predictive values do not estimate the risk of falling according to the patient's signs and symptoms, and are affected by prevalence. If the prevalence of falls in the study is different from the whole society to which the individual belongs, the predictive values calculated in the study do not make an accurate estimation of the risk of falls for the individual.

Two other validity indices which should be used in clinical decision-making are positive and negative likelihood ratios. The results of likelihood ratios indicate how much the test results change the risk of falling estimated before performance of pretest probability test.

Since likelihood ratios can also be used in tests with continued formats for measuring the distances, Riddle and Stratford [21] believe that they are more beneficial than sensitivity, specificity and predictive values, which are confined to tests with double formats.

According to the results of the study, the risk of falling in an elderly individual with a Berg balance score of 44 and less is 8.16 times (positive likelihood ratio) greater than the probability of not falling, and in an elderly individual with a score more than 44, the negative likelihood ratio is 0.13, i.e. the risk of falling in a patient with a negative Berg Balanced Scale score (equal to or more than 44) is 0.13 times greater than the probability of not falling; in other words, positive likelihood ratio of 8.16 in a patient with a score equal to or less than 44 increases the pretest probability, and negative likelihood ratio of 0.13 in a patient with a score more than 44 decreases the pretest probability. Since determining the prevalence does not change the likelihood ratios, they can be generalized to other patients too.

This study was performed in a small number of elderly

populations. The application of this study to individuals living in another setting would be speculative. However, further prospective studies are warranted to confirm these results with a large sample size of the elderly representing various lifestyles.

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Original Contribution/Clinical Investigation

The relationship between depression and educational levels, the retirement years and chronic diseases of elderly men in area 6 of Tehran's municipality 2005

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ABSTRACT

Introduction: Depression is one of the most common disorders in the elderly that can increase the morbidity and mortality in this age.

Objectives: To determine the status of depression and the relationship between that and the level of education, the retirement years and chronic disease of elderly men in area 6 of Tehran's municipality (2005).

Materials and Methods: This is a cross-sectional study in which the geriatric depression scale (GDS) has been used to determine the status of depression in older male adults.

Results: In this study 49/3% of men had Middle and Severe stages of depression and there was not any significant relationship between depression and educational levels, the retirement years and chronic diseases. But there was a direct relation between chronic diseases and retirement years.

Conclusion: As the results show, nearly half of the elderly men have depression of middle and severe status, so recognizing their problems and diseases is important for making proper plans and interventions.

Key words: Elderly, chronic diseases, retirement years, educational levels.

Introduction

Many studies have explored the problems of the elderly⁽¹⁾. Elderly can be defined as every person who is 60 years old and over⁽²⁾. Although aging is not always an unpleasant event, it is a natural process of life that all of us will experience. Entering this phase, unlike the puberty phase, doesn't have any significant signs and symptoms,

but a lot of factors, in addition to the passing time and the years of life.

In the year 200 A.D Galenus said that elderly is the boundary of good health and illness⁽⁵⁾. The development of caring for the elderly's problems had stopped in the middle ages until the eleventh centuries that Avicenna had a great observation about chronic and psychic disease in adults⁽⁶⁾.

In Islam older adults are very respectable. The world's population is aging and the rate of older adults is increasing, so societies are faced with a lot of new social, physical, psychic and health problems.

Therefore every planner in different levels of societies must try to consider the elderly's problems from a variety aspects of medical, psychical and economical situations ⁽⁷⁾.

The United Nation predicts that the population of the world from 1950 will be three times more than 2.25 and the population of 65 year olds will be five times and over eighty years old will be seven times more than today's population ⁽⁴⁾.

It means that by the year 2020, 13% of the world's population will be over 50 years old that 70% of these are living in developing countries, and it is estimated that from every 10 elderly people, 7 people are living in developing countries.

A census of the 1986 Iranian population of elderly was 2,686,350 persons and in the year 1995 it was 4.3 % and in 2004 it was 6.8 % of the present Iranian population ⁽⁸⁾.

Nakajina said if the main approach of public health in the 20th century was life expenses, the new approach for the next century is better life with better quality.

If in the year 2020 year almost one milliard of the population of the world will be 60 years old, it is necessary that the community must focus on health and social well being ⁽⁸⁾.

One of the most common disorders in the elderly is depression. At this period of life it is at high levels .

Depression is a mood disorder that can be recognized by perceptual and behavioral disturbances. Signs of depression can be revealed in major and minor forms. It will lead to an increase in morbidity and mortality in elders and can decrease the quality of their lives⁽²⁾.

The prevalence of depression in 65 years old and over, is more than 25 percent. In the ordinary situation 15 percent of elders have depression but in Iran, after the imposed war, this rate became more than 15% ⁽⁸⁾.

The symptoms of depression are deep depressive feelings that are not related to any factor in a patient's life. Characteristics of psychotic depression are generalized melancholic feelings, pessimistic insight about the future and poor self-esteem. These symptoms include psychomotor retardation, insomnia, loss of weight, constipation, lack of appetite and instability ⁽¹⁰⁾.

Secondary depression such as hypothyroidism depression, and secondary depression related to parkinsonism and dementia, are in this category ⁽³⁾.

In the year 2004, Iran's population was 70,000,000 and 12 % were elderly and it will be 15% in 2020 ⁽¹¹⁾.

Prevalence of depression can be increased from 10% to 30% in patients with chronic diseases, such as diabetes, stroke and rheumatoid arthritis ⁽⁸⁾.

Dorsey et al found a significant relationship between hypertension and depression and between diabetes mellitus type II and depression ⁽⁹⁾.

Since older adults are a large group of the Iranian population, it is important for community health care personnel to recognize their problems and diseases to make accurate plans and interventions.

The findings of this research can help Health care professionals, and special nurses to get used to the importance of elderly problems.

The aim of this study is to determine the relationship between depression in elderly men with educational levels, the retirement years and chronic disease in Area 6 of Tehran's municipality.

Special of purposes:

- To determine the depression status in elderly men in area 6 of Tehran city.
- To determine the relationship between depression and educational levels in elderly men in area 6 of Tehran city.
- To determine the relationship between depression and retirement years in elderly men in area 6 of Tehran city.
- To determine the relationship between depression and chronic diseases in elderly men in area 6 of Tehran city.

Material and methods

Tehran is the capital city of Iran, and it has 12,000,000 citizens. Tehran is divided into 23 municipal areas, and one of them is area 6.

This is a cross-sectional study. The materials of this study were two questionnaires.

The first questionnaire was on the personal and demographic information about the elderly men and the second was the 30 part geriatric depression scale questionnaire

(GDS). This scale has 2 forms. The main form has 30 questions and the short form has 15 questions with “Yes” or “No” answers with 84% sensitivity and 95% specificity that can differentiate depressive people from the healthy⁽¹²⁾.

The target population was all of the elderly men who go to the area 6’s mosques. For this study, the researcher went to the mosques at the time of midday prayer for 2 weeks and filled the questionnaire by simple random sampling after introducing herself and talking about the aim of the research.

In this study, the elderly men were in the ages 60 and over; the diseases were defined as diabetic mellitus, (DM) hypertension (HT) and chronic heart diseases (CHD), retirement ages (RA). Educational levels were defined as 2 groups: one group was undergraduate at high school and the other one was university education (UE) group. For the analysis of data we used software SPSS, version 10.

Results

From all 235,303 citizens of area 6 about 2,240 persons were in elderly ages and about 100 people expressed their consent to fill the questionnaires.

Most of the participants were between 60 to 62 years old. 75 percent were married and 44/4% had been retired more than 10 years.

Approximately 49/3% of them had depression at the middle or severe stages and 50/6% didn’t have depression. 48/1% were undergraduates and 51/8% had university education also, 51/1% of elderly men who were retired more than 10 years didn’t have depression and 50% who had been retired more than 10 years were in the moderate, or severe status of depression (**Table 1**).

Table 1: the determine the demographic profile of the elderly

Demographic situation	Percentage
Age	
60-69	59/2
70-79	30/4
80-89	10/2
Marital situation	
Married	75
Single	12
Divorced	13
Years of retirement	
More than 10 years	44/4
Less than 10 years	55/6

Educational level	
Under graduated of High school	48/1
University education	51/8
Living arrangement	
Living alone	8/8
Living with family	91/2

The rates of depression of the elderly men and hypertension(12%) was higher than that of diabetes mellitus (6%). Also, in the current study depression was not associated with CHD (**Table 2**). The findings of the present study reflect the situation of these groups of elderly.

Table 2: relationship between depression and retirement, hypertension, diabetes and chronic heart disease. At the elderly men

Depression			P-value
*(HTN)			
	Absence	Present	
Absence	12	48	0/236
Present	13	37	
*DM			
	Absence	Present	
Absence	6	22	0/305
Present	18	54	
*CHD			
	Absence	Present	
Absence	1	10	1/1000
Present	5	84	
*RA			
	Absence	Present	
Absence	1	35	0/845
Present	4	60	

HPT= Hypertension
DM= Diabetes mellitus

CHD = chronic heart Disease
RA= Retirement ages

Discussion

Approximately, half of the samples in this study had moderate to severe depression stages and there wasn’t any significant relationship between chronic diseases, years of retirement and educational levels in the elderly men. In a study (2003) into malaise,⁽¹²⁾ Norsiah didn’t find any significant relationship between hypertension and diabetes but there was a relationship with ischemic heart disease ⁽⁷⁾.

In a study Shire indicated that depression may cause more problems in the elderly and via the medical diseases are the risk factors for elderly depression ⁽⁴⁾.

This prepared study only shows the situation at the time

of the research, because the time for data collection was short. It could not be used for generalizing data in this area.

On the other hand, the measurements of medical disease were based on the participant's information and there wasn't any medical record to confirm the chronic diseases.

Conclusion

To consider the findings and the importance of elderly problems it is suggested that this research is performed in other areas of Tehran and Iran and elderly women should enter the study too.

Since depression in elderly men in this study is significant, interventional plans should be directed at helping this group of society. These plans can help supportive groups of volunteers to diagnose the depression in the elderly, sooner than later.

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12. Sherian MOHD Sidik. Etal. "Prevalence of depression with chronic illness among the elderly in rural community in Malaysia. *Journal of Asia pacific family medicine* 2003; 2: 196-199. Introduction Compared with the younger population, the elderly have increased susceptibility to infection and are at significantly increased risk for morbidity and mortality due to many common infections [1]. Possible explanations for the observed higher morbidity and mortality rates among older patients include low physiological reserves due to the biologic changes that accompany aging and the frequent presence of comorbid illnesses. Morbidity and mortality rates also are influenced by age and comorbidity-related decremental changes in host defenses. Also delays in diagnosis and initiation of appropriate treatment due to atypical presentation may lead to increased morbidity and mortality [2].

Evaluating Infectious Etiologies of Hospitalization in Elderly Population of Iran

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Abstract:

Background and Objectives: Regarding the increase in life expectancy in geriatric population, we decided to perform a study to evaluate infectious causes of hospitalization in elderly patients in 3 infectious wards in Tehran.

Methods: Medical Records of 667 hospitalized elderly patients (>65 year old) were reviewed retrospectively since March 2003 to March 2004. Data was analyzed by SPSS 12.

Results: Most admissions (Mean age of 75 years) were in summer and fall. Respiratory tract infections (RTIs) were the most common cause of admission in infectious wards (41.4%). Other common causes were as follows respectively: Urinary Tract Infections (21.9%), Sepsis (9.3%), Gastrointestinal Infections (7.8%), Non-infectious etiologies (4.9%), Skin and Soft tissue Infections (4.3%), Tuberculosis (3.4%), Septic Arthritis (1.9%), Hepatitis (1.6%), Meningitis (1%), Fever of Unknown Origin (0.9%), Endocarditic (0.4%). and 0.9% Expired before diagnosis. 92.1% of patients survived and 7.9% expired. Sepsis was the most common infectious etiology of death (45.2%).

Conclusion: RTIs are the most common causes of elderly hospitalization in infectious wards of Iran. Infectious wards are mostly crowded in summer and fall. These results mandate special care for prevention of respiratory tract infections such as vaccination and planning other preventive measures required for the elderly population in Iran.

Keywords: Elderly, Hospitalization, Infection

Introduction

Compared with the younger population, the elderly have increased susceptibility to infection and are at significantly increased risk for morbidity and mortality due to many common infections^[1]. Possible explanations for the observed higher morbidity and mortality rates among older patients include low physiological reserves due to the biologic changes that accompany aging and the frequent presence of comorbid illnesses. Morbidity and mortality rates also are influenced by age and comorbidity-related decremental changes in

host defenses. Also delays in diagnosis and initiation of appropriate treatment due to atypical presentation may lead to increased morbidity and mortality^[2].

Demographic aging is now well established, and the elderly population (age, >65 years) will exceed 1 billion persons in 2030^[3]. To date, the projection of population aging predicts that the proportion of elderly individuals will be as great as 19.6% and 23.0% of the population in North America and Europe, respectively, compared with 4.6% in Africa and 11.5% in both Asia and Latin America. However, these proportions are changing^[3],

and in 2030, more than three-quarters of the elderly population are predicted to live in developing countries.

It is projected that, in 2020, three-quarters of all deaths in developing countries could be due to age-associated diseases. These are predominantly non-communicable diseases, such as cardiovascular disease, cancer, and diabetes. What is the role of infection in the death of elderly individuals? Statistics from the WHO [4] suggest that, in Europe and the United States, 5% of the population >60 years old will die as a consequence of infection, compared with 20% in Africa.

Although demographic aging does not remain restricted to industrialized countries, the medical challenge arising from the aging population will be distinct in the developing world. This is particularly true with respect to infectious diseases, which have a distinct spectrum in the elderly population, as well as a greater overall relevance in the developing world. Tropical diseases have a specific presentation and epidemiology in elderly patients. Infectious diseases with a worldwide distribution impact elderly patients in the developing world in a specific manner, which is most obvious with respect to human immunodeficiency virus and tuberculosis but is also true with respect to "trivial" manifestations of infection, such as diarrhea and pneumonia. Malnutrition contributes in a major way to the immunodeficiency of elderly patients in the developing world. Poorly controlled use of antimicrobial drugs leads to multidrug-resistant microorganisms, which, together with the limited resources available for drug treatment, makes appropriate treatment of infections in elderly patients in developing countries very difficult. Infections in elderly patients will have an increasing impact on the public health and economy of developing countries [3]

This study is designed to determine common infectious etiologies of hospitalization in elderly populations of Iran as a developing country in the Middle East region.

The results of this study are useful for planning of preventive care and a special policy for hospital beds required for common infectious diseases leading to hospitalization in this country.

Methods

In this retrospective study, medical Records of 667 hospitalized elderly patients (>65 year old), admitted in teaching infectious wards of Shaheed Beheshti Medical University since March 2003 to March 2004, were reviewed. This university is one of three major universities in the capital of Iran and covers east, north and west parts of Tehran province. Variables including

registration number, date of admission, season of admission, age (categorized in 5 years intervals), sex, diagnosis and outcome (survived or expired) were recorded for each patient. Diagnosis recorded for each patient was defined as below: 1. Respiratory tract infections 2. Gastrointestinal tract infections (except for hepatitis) 3. Urinary tract infections 4. Central nervous system infections 5. Tuberculosis (involving all systems) 6. Endocarditis 7. Hepatitis 8. Skin and soft tissue infections 9. Septic Arthritis 10. Fever of unknown origin 11. Sepsis 12. Noninfectious diagnosis and a proportion were expired before diagnosis. Data sheets were completed and analysis was performed by SPSS (version 12).

Results

Data for 667 patients were recorded. 55.8% were male and 44.2% female. Mean age of patients was 75 years (ranging from 65 to more than 95 years). 55.8% were male and 44.2% female.

Respiratory tract infections (276 cases, 41.4 percent) were the most common cause of admission in infectious diseases wards. Other Common causes of hospitalization in infectious wards were as follows respectively: Urinary Tract Infections (146 cases, 21.9 percent), Sepsis (62 cases, 9.3 percent), Gastrointestinal Infections (52 cases, 7.8 percent), Non-infectious etiologies (33 cases, 4.9 percent), Skin and Soft tissue Infections (29 cases, 4.3 percent), Tuberculosis (23 cases, 3.4 percent), Septic Arthritis (13 cases, 1.9 percent), Hepatitis (11 cases, 1.6 percent), Meningitis (7 cases, 1 percent), Fever of Unknown Origin (6 cases, 0.9 percent), Endocarditic (3 cases, 0.4 percent) and 6 patients (0.9 percent) were expired before diagnosis.

Most cases were admitted in summer (182 cases, 27.6 percent) and fall (180 cases 27.3 percent). 25 percent were hospitalized in spring, but only 20.1 percent in winter. Most patients with tuberculosis and respiratory tract infections were admitted in fall. GI tract infections, UTI, meningitis and endocarditis admitted mostly in spring. Sepsis, septic arthritis and hepatitis admitted mostly in summer and skin-soft tissue infections in winter. 92.1 percent of our patients were discharged and 7.9 percent were expired during hospital course. Sepsis was the most common cause of death in hospitalized elderly populations (4.2 percent). Other causes for death were: Respiratory Tract Infections (1.9 percent), Urinary Tract Infections (0.6 percent), Tuberculosis (0.3 percent) and 0.9 percent were expired before diagnosis.

Diagnosis specific mortality rate was as follows: Sepsis (45.2) percent, Respiratory Tract Infections (4.7 percent),

Urinary Tract Infections (2.7 percent) and Tuberculosis (8.7 percent).

Discussion

Average life expectancy throughout developed countries has rapidly increased during the latter half of the 20th century and geriatric infectious diseases have become an increasingly important issue. Infections in the elderly are not only more frequent and more severe, but they also have distinct features with respect to clinical presentation, laboratory results, microbial epidemiology, treatment, and infection control. Reasons for increased susceptibility include epidemiological elements, immunosenescence, and malnutrition, as well as a large number of age-associated physiological and anatomical alterations (5).

In industrialized countries, pneumonia, urinary tract infections, and skin and soft-tissue infections are the most relevant infections in elderly patients [5, 6, 7]. In 2002, WHO reports that in developing countries, pneumonia is one of the leading causes of death in elderly patients (those >60 years of age).^[4] Studies from South America, India, and Africa investigating the global impact of infections in elderly patients conclude that, compared with industrialized countries, pneumonia, urinary tract infections, and skin and soft-tissue infections are the most relevant infections in elderly patients [5, 6, 7].

Our study is the first that evaluates infectious etiologies of hospitalization in elderly populations of Iran and shows that respiratory tract infections (mostly pneumonia) are the most common cause. This result is compatible with other studies in industrialized and developing countries [5, 6, 7, 8, 9].

In Switzerland, causes of death in a hospitalized geriatric population were evaluated [8]. Macroscopic and histological studies of 3000 consecutive autopsies (43.9 percent of the registered deaths) were performed by the same pathologist in a geriatric institution over a period of 20 years. Bronchopneumonia (42.9), malignant neoplasms mainly of the gastrointestinal tract and its annexae and the lungs (28.1 percent)-pulmonary thrombo-embolism (21.2 percent) and acute myocardial infarction (19.6 percent), were the most prevalent fatal conditions observed. Next, in decreasing order were: urinary tract infection (12.3 percent), acute cerebrovascular disease (6.5 percent), internal haemorrhage (5. percent 5), and congestive cardiac failure (3.3 percent). Some potentially treatable disorders, which led to death were unsuspected clinically: for example, acute pyelonephritis (87 percent), pulmonary thrombo-embolism (74 percent), acute myocardial infarction (74 percent) and active pulmonary tuberculosis (61 percent). We see that the most common cause of

death in this study is equal to the most common cause of hospitalization in our study. This correlation shows the significance of pulmonary infections as a common etiology for mortality and morbidity in elderly.

In another study, in Singapore, the presentation of elderly people at an emergency department was evaluated [9]. Patients aged 60 years and above who attended the Emergency Department (ED) at Alexandra Hospital, Singapore, during 4 randomly selected one-week periods in 1996 were retrospectively studied. The 3 most common diagnoses were chest infection or pneumonia (8.2 percent), non-fracture head injury (7.2 percent) and heart failure (6.6 percent). The elderly constituted 12.4 percent of attendance at the ED but formed 34.5 percent of admissions. They were more likely to have emergency problems. They concluded that understanding the common presenting symptoms and diagnoses of the elderly will help doctors at the ED provide better care. The results of this study also show that pneumonia is the most common cause of elderly emergency department admission in Singapore, which is compatible with our results of infectious wards admission in Iran.

Most of our patients were admitted in summer (27.6 percent) and fall (27.3 percent). Unfortunately we did not find any study to compare this finding with it. Although most patients were admitted in summer and respiratory tract infections were the most common cause of admission, but most patients with respiratory tract infections were admitted in fall. It can be explained with the fact that most cases with gastrointestinal tract infections, sepsis and urinary tract infections were admitted in warm seasons (spring and summer).

Mortality rate for respiratory tract infections in our elderly population was 4.7 percent. Torres et al. [10], in a study of 124 patients with chronic obstructive pulmonary disease (COPD) and CAP (mean age \pm SD, 67 \pm 11 years; 115 males; 2 patients at a nursing home) found that the overall mortality rate was 8 percent. Although the mean age of their patients is similar to ours, but the difference in mortality is mainly explained by their underlying condition (COPD). In another study [11], in-hospital case-fatality rates for pneumonia in the first 10 days of hospitalization and overall was 2.1 percent and 3.2 percent respectively, for 11,684 patient hospitalizations that are nearer to our results.

Mortality rate for sepsis in our elderly population was 45 percent. Multiple prospective studies have shown increasing age to be associated with a high rate of death due to sepsis, independent of severity of illness and presence of comorbid conditions [14, 15]. Angus *et al.* [16] reported that the overall mortality rate associated with sepsis was 28.6 percent, whereas the rate among

patients 85 years of age was 38.4 percent. However, the association between advanced age and an excess number of deaths due to sepsis is not uniformly observed in epidemiological investigations [17]. In a recent study [18] of 406 patients with sepsis, age was a risk factor for in-hospital mortality on univariate analysis; however, on multivariate analysis, this association was no longer seen.

We recorded no mortality for meningitis, endocarditis, fever of unknown origin, gastrointestinal infections, skin and soft tissue infections, septic arthritis and hepatitis. These results are in contrast to other studies [12, 13], which demonstrate increased mortality rate among elderly patients with such diagnoses. This may be explained by the fact that few cases were recorded in these groups in our study.

We conclude that respiratory tract infections are the most common causes of hospitalization in infectious wards in elderly population of Iran. Infectious wards are mostly crowded with elderly patients in summer and autumn. Mortality (45.2 percent due to sepsis) is directly related to the etiology of hospitalization. These results would mandate special care for prevention of respiratory tract infections such as vaccination and planning a special policy for hospital beds required for elderly patients in Iran. Prevention, early recognition, and prompt initiation of empirical antimicrobial therapy are the cornerstones of the strategy to reduce the impact of infectious diseases on older adults.

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The Economic Impact of Treating Geriatric Hip Fracture - A Study at Rustaq Referral Hospital , South Batinah Region, Oman

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Abstract

Hip Fractures in the Geriatric Population is on rise in Oman with need for increased number of hip fracture beds and this has heavy impact on the health service resources. To date there has been no study detailing with the Economic Impact of such injuries in Oman and the Middle East in general. In the present study 150 patients who were admitted with a hip fracture to Rustaq Hospital, which is a Referral Hospital in South Batinah Region of Oman, from March 1998 to March 2006 were included in this study to determine the expenditure incurred during hospitalization of patients, including the costs associated with surgery (O.T., implants costs) and Radiological, Laboratory investigations. The mean total hospital expenditure per patient was found to be RO 1010.6 of which ward costs contributed 60 percent, operative costs 21 percent and investigations 19 percent. All of these results have shown a growing Economic Impact arising from the inpatient treatment of Acute hip fractures.

Key words: Hip fractures, Economic Impact, Intracapsular, Extracapsular,

Abbreviations: GCC(Gulf Cooperation Council), RO (Rial Omani), MOH (Ministry of Health), HDU (High Dependency).

Introduction

A hip fracture remains one of the commonest reasons for an elderly person to be admitted to an acute Orthopaedic Ward. The number of hip fractures is on the rise in the geriatric population and with projected increases in population above 65 years the incidence of hip fractures will rise exponentially⁽²⁰⁾. Hip fracture patients occupy more and more hospital beds with a long hospital stay and a protracted rehabilitation period^(9,22) which leads to

a heavy economic impact on health service resources^(8,14). In addition, inflation in the health service is greater than the general economy.

There is no study in the Middle East detailing the costs of hospitalization and treatment of hip fractures in geriatric populations. All literature available is from the western world with data reports showing wide variation in cost evaluation in different studies which may not be applicable to this region⁽¹⁾. Most of the countries of GCC have

free treatment in Govt. Hospitals for their nationals. The primary aim of the present study is to have detailed assessment of medical costs incurred during acute hospitalization and treatment of hip fracture as per the billing rates applicable to Non GCC / Non Omani Nationals which is an indicator of cost incurred in treatment of Hip fracture in general in Oman.

Methods

The study was carried out at the MOH Rustaq Hospital, which is the Referral Hospital for South Batinah Region of Oman. A detailed retrospective study of hospital records was undertaken for all patients. In all 150 patients were selected for this study. Patients less than 60 years and those with peri-prosthetic fractures, Metastatic disease or Polytrauma were excluded.

The cost of treatment was evaluated by selecting the Major Components as : acute Ward Costs, Investigations performed, Theatre expenses. **(Table I)**

Table I Demographic data

	Demographic	Total Number Patients 150
1.	Mean Age (Years)	80 Years
2.	Sex Distribution (%) Female Male	95 55
3.	Mean Hospital Stay (days)	16 days
4.	Fracture Types Intracapsular Extracapsular Sub Trochanteric	68 74 8
5.	Mean Operating Time (min)	70

Ward Costs: Included the length of stay in Orthopaedic Ward, Intensive Care Unit, high dependency beds. The help of the Finance Department of the hospital was taken to determine the average cost per day as per the quoted rates by MOH Oman Billing Rates. Any delay in surgery in days was recorded for each patient and the total number of delayed days with resultant costs was calculated. The average daily cost of stay in Ward/HD was RO 10, ICU RO 40 respectively. This included the cost of nursing care, meals provided by hospital and other daily ward expenses.

The cost of Surgery was calculated from the operation duration in minutes and cost of implant used. **(Table II)**. Patients stay in recovery area, use of OT Equipment, disposable items including those utilized by the anaesthetic team. All costs including Pathology, Microbiology and Radiological investigations performed were carefully analysed for each patient. The sum total of all the expenses **(Table III)** incurred in treatment of each patient

was calculated.

Table II Operations costs related to duration

	Operating Time	Costs in Rial Omani
1.	180 minutes to 360 minutes	848
2.	91 minutes to 180 minutes	424
3.	46 minutes to 90 minutes	212
4.	01 minutes to 45 minutes	106

Table III Cost of inpatient investigations (as per rates of MOH)

Test	Cost (Rial Omani)
Haematology CBC Sickling Coagulation Pupile Blood Grouping ABG	3.000 3.000 15.000 3.000 3.000
Biochemistry Glucose LFT RFT	3.000 3.000 3.000
Microbiology Blood Culture Urine Culture Urine Routine Urine Ketones	4.500 4.500 1.000 2.000
Radiology X-Ray (per film) Ultrasound MRI C.T. C – Arm	8.000 25.000 150.000 100.000 25.000
Others - ECG Biopsy	5.000 10.000

Results

In our study of 150 patients there were 95 females and 55 males, the mean age was 80 years (range 60 - 90 years). The mean hospital stay was 16 days (range 10 - 21 days).

Seventy four patients had sustained extra-capsular neck femur fractures, sixty eight had intra-capsular fractures and the remaining eight had sub-trochanteric fractures. Five patients were treated non-operatively. Surgical procedures included: 62 Hemiarthroplasty (60 Austin Moore, 2 Thompsons), 69 Dynamic hip screw fixation, 6 cannulated cancellous screw fixation. The mean operative time was 70 minutes (range 30 minutes to 90 minutes). Thirty-two (21%) of patients had delay in surgery due to lack of operating time. The mean delay was 3.3 days (1 - 5 days) which amounted to total of 105 bed days and total cost of Rial Omani 1056.

The cost of routine investigations is detailed in Table III.

The mean total cost of hospital expenditure per patient was found to be RO 1010.6. The details of breakdown costs of Inpatient treatment of Hip Fractures is outlined in **Table IV**.

Table IV Breakdown of cost from inpatient treatment of hip fractures in 150 patients

	Items	Costs (RO)	% of Total Cost
1.	Hospital Stay (Ward/HD/ICU)	91000	60
2.	Operative	31800	21
3.	Laboratory (including Transfusion)	20700	13.6
4.	Radiology / ECG	8100	5.4
5.	Total Cost	151600	5.4
6.	Average Cost Per Patient (Rial Omani)	1010.6	

Discussion

There are an increasing number of ageing patients with Hip Fractures in Oman and therefore the cost of falls incurred by the State health services is expected to escalate (12,18). Hip Fractures accounted for approximately 30% of orthopaedic bed occupancies in our hospital and based on the current population trends the number of hip fractures will rise in the near future. We calculated the mean hospital cost of treating hip fracture to be RO 744. Since there are no figures from the Middle East, to compare, we compared our costs with other studies from the Western World. (Table V) Our cost estimates were lower than the estimates in Table V. The observed differences may be in part related to number of factors such as ethnic composition of the population, diet, social factors and effects of inflation (16). Of the total costs ward stay contributed 60%, operative costs 21% only and the remainder were due to investigations carried out such as Laboratory tests and Radiology.

Table V Comparative data of acute care costs of treatment of hip fractures

Study	Year	No. of Patients	Average Hospital Stay (days)	Average Costs £ / R.O
Present Study	2005	150	16	£1435 / 744
Thomas	2003	100	23	£ 12163/8687
French	1995	50	20	£ 4018 /2870
Hollingsworth(10)	1993	1080	42	£ 5606 /4004

(Conversion Rate: 1 Rial Omani == Sterling £ 1.42)

These figures highlight the growing expense incurred by the state health service in the acute treatment of hip fractures most of which results from increased period of hospital stay. One of the potential ways to minimize expenditure following hip fractures is to reduce the duration of hospital stay.^(13,21,22) Delay in surgery due to inadequate operating time on trauma list is common in many hospitals. In our study 32 patients (21%) had delay in Surgery and a total of 105 bed days were used in this way costing RO 1056; this lead to inefficient bed usage, increased nursing dependency, longer hospital stay and more patient morbidity. This implies that provision of adequately trained manpower and operation theatre resources would go a long way in minimizing surgical delays and improve patient care and reduce hospital expenditure.⁽¹⁶⁾ The other aspect of introducing shorter hospital inpatient stays after surgery and improving rehabilitation programmes will prove to be very cost effective and improve health outcomes^(9,13) as the majority of inpatient stay is spent after recovery from surgery⁽¹⁶⁾. Various strategies, such as early mobilization of patients⁽⁴⁾ joint orthopaedic - geriatric rehabilitation⁽¹⁵⁾ and “hospital at home” teams⁽¹⁷⁾ would reduce inpatient stay and also release hospital beds with subsequent favourable effects on elective waiting lists^(19,20).

Our present study is unique. It is the first study carried out in the Middle East where we have tried to correlate in detail the clinical data from which costs were derived for treating acute hip fractures in Referral MOH hospital in Oman. We have retrospectively accounted for each patient’s day and all pre and post operative investigations, operative data including the duration of surgery and type of implant used. There are however several limitations in the interpretations of these results. Firstly being a retrospective study, it is possible that we may have failed to incorporate all costs related to hip fracture. Secondly, the Ambulance Cost, Social care, Travel and outpatient costs must be taken into account when formulating the overall cost for hip fracture^(13,14). Finally the accounting system of the MOH has had changes over a period of time making precise billing evaluation difficult. However the same limitations and inaccuracies in accounting are expected to be present universally in other studies also^(20,21). Nevertheless, the present study is the most recent and only study projecting the cost of treating hip fractures in Oman and Middle East in general. Careful review of Table V has shown that reducing the length of stay has not significantly reduced the overall costs, possibly as inflation is going up. It is therefore more pertinent to tackle the basic problem of reducing the occurrence of hip fractures in geriatric population by targeting the osteoporosis and prevention of falls^(4,20). In addition the use of External hip protectors has proved to be valuable in decreasing rate of hip fractures in Geriatric patients⁽³⁾. The costs of

Acceptable Satisfaction after Carpal Tunnel Decompression in Elderly Patients

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ABSTRACT

Background: A number of factors have been reported to influence the outcome of carpal tunnel decompression including gender, alcohol use, mental health status, and presence of objective neurologic signs. Moreover, there was an attempt to determine the outcomes of carpal tunnel decompression in elderly patients and whether outcomes can be predicted by the severity of pre-surgical nerve conduction study results.

Methods: In this retrospective study 57 patients (83 hands) over 60 years of age who had carpal tunnel decompression between 1998-2002 inclusive. All patients responded to a universal questionnaire. In all patients preoperative nerve conduction studies were scored by the grading system from 1 to 6.

Results: Seventy percent had marked to severe neurophysiologic changes (grade 4-6). The mean post-surgical symptom severity score was 1.47. There was a significant relationship between pre-surgical nerve conduction grade and post-surgical symptom severity score.

Conclusion: Elderly patients have low post-surgical symptom scores and have good satisfaction levels after decompression.

Keywords: carpal tunnel; satisfaction; decompression

Introduction

There are lots of controversies about the effectiveness of carpal tunnel release in elderly patients. Moreover, some have reported satisfactory outcomes following surgery in the elderly (Papaloizos and Simonetta, 1991; Tomaino and Weiser; 2001; Weber and Rude, 2005) ^(1,2,3), while others have reported worse outcomes in older patients (Atroshi et al, 1998; Greenslade et al, 2004; Porter et al, 2002) ^(4, 5, 6). Pre-surgical nerve conduction studies are used to aid the diagnosis of carpal tunnel syndrome (CTS). The predictive value of nerve conduction

studies, however, remains controversial ^(7, 8, 9). There was an attempt to re-evaluate the impact of age and neurophysiological studies upon outcome of carpal tunnel decompression.

Materials and methods

Between 1998 and 2002, 83 elective carpal tunnel decompressions in 57 patients over 65 years of age were performed in our center. Inclusion criteria were as follows: Patient over 65 years of age at time of

surgery, a minimum of 1.5 years of follow-up evaluation, neurophysiologically proven median nerve compression, and the patient's ability to complete a standardized questionnaire. There were 26 bilateral procedures. Mean age was 68.5 years (range 65-78) and 50 (87%) of the patients were women.

In our center routinely neurophysiological study is requested for all of the patients who have problems in favor of CTS. All nerve conduction studies were graded based on amplitude- weighted system (**Table 1**).

All of the patients were operated under general anesthesia or bier block anesthesia in the operating room after tourniquet inflation. The incision is marked about 6 millimeter ulnar to the thenar crease to ensure that any scarring is away from the median nerve and that the incision is well ulnar to the palmar cutaneous branch of median nerve, which is located in the thenar crease. A curvilinear incision is made paralleling the thenar crease, 2-3 centimeter in length, and ending just distal to the transverse wrist crease. The transverse carpal ligament was divided under direct vision. No patient underwent endoscopic decompression. The mean follow-up for each patient was 26 months (range, 14-39 months).

All patients responded to symptom severity questionnaire of Levine et al. This questionnaire has eleven questions. Each question is scored from 1 to 5, where 1 is normal or no symptoms and 5 is the worst score. A mean score is calculated for each patient. Statistical analysis was performed using statistical software.

Results

Seventy percent had marked to severe pre-surgical nerve conduction studies grades. The mean post surgical severity score for all patients was 1.47. In 58 hands (69%) had none to mild symptoms and the others (25 hands, 31%) had mild to moderate symptoms. No patient had symptom in favor of severe grades. All patients with post surgical symptoms severity score greater than 2 had a pre-surgical neurophysiological study results of grade 4 or greater. For better evaluation of outcome of surgery, the questions were categorized into three groups: 5 questions (1-5) were concerned with pain, 4 questions (6, 8-10) with numbness and tingling, and 2 questions (7, 11) with function and strength. The mean score for the pain score, the numbness score, and the functional score were 1.58, 1.44 and 1.39. This showed little difference in outcomes with regard to pain or sensory symptoms or function. There was a significant relationship between nerve conduction grade and symptom severity score (P.value <0.01). Despite this relationship, full range of scores from 1.1 to 2.9 were seen in the most severe grade and most patients with grade 5, 6 were satisfied with the outcome of their surgery.

Discussion

There is controversy over the outcome of carpal tunnel decompression in elderly patients. Two small retrospective studies have reported satisfactory outcomes from surgery in elderly patients.

Papaloizos and Simonetta in 1991 studied 37 patients aged above 75 years and reported that paresthesia and loss of cutaneous sensitivity were improved in 76% and 61% of cases, respectively, and that only three patients (8%) reported no improvement in their symptoms following surgery ⁽¹⁾. Tomaino and Weiser in 2001 reported that 11 of thirteen patients over 70 years of age with advanced carpal tunnel syndrome were satisfied with the outcome of surgery and that, of all patients with preoperative numbness, the symptoms had resolved in nine patients at 2 year follow-up ⁽²⁾. Weber and Rude have recently reported a prospective series of 75 patients over 65 years of age in which, at 6 month follow-up, 83% of patients were completely, or very, satisfied with their surgery and only two patients were dissatisfied. ⁽³⁾

Some comparative studies have reported worse outcomes in older patients. Porter showed that patients over 60 years of age had significantly less improvement in symptom severity and functional status and only 66% were satisfied after surgery compared with 87% satisfaction in patients under 60 years of age ⁽⁶⁾. Bland found that older patients had a poorer prognosis independent of other factors. ⁽⁷⁾

But, in the present study, the mean severity score was 1.47 which compares favorably with the published mean score of 1.3 to 1.9 from other studies using this instrument ^(6, 8, 9, 10). Results of this study confirm those of Tomaino and Weiser and Papaloizos and Simonetta studies.

In most centers neurophysiologic studies play an important role in the diagnosis and management of CTS. Various grading scales have been proposed that are based largely on conduction velocity criteria. Although in the present study there was a significant relationship between the presurgical conduction velocity and postsurgical total severity score.

Several authors have found that nerve conduction studies do not improve or predict the clinical outcome of carpal tunnel surgery ^(11, 12, 13, 14). In light of these findings many recent studies have questioned the need for nerve conduction studies ^(15, 16). In summary this study revealed high satisfaction rates and good outcomes can be expected in CTS surgery in the elderly even when

neurophysiologic tests show marked abnormalities. The post surgical symptom severity scores in our group compare favorably with published scores in younger patients. Severe pre-surgical neurophysiologic abnormalities should not preclude elderly patients from surgery because they tend to have higher symptom severity scores before surgery than the milder grades; they are still likely to be satisfied with surgery, particularly if realistic expectations about surgical outcome are established at the outset.

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Table 1: Grading Carpal Tunnel Syndrome by Using Neurophysiologic Criteria

Grade	Palmar Latency	Sensory Conduction Velocity	Distal Motor Latency	Sensory Amplitude	Motor Amplitude
6(Severe)	----	----	----	absent	absent
5(Very marked)	----	----	----	>7.0 SD or absent	and>4.0 SD
4(Marked)	----	>5.0SD	or >5.0 SD	and>4.5 to <7.0SD or absent	or>4.0SD
3(Moderate)	----	>4.0 to <5.0 SD	or >4.0 to <5.0 SD	and <4.5 SD	or <4.0SD
2(Mild)	>3.5 SD	or >3.0 to <4.0SD	or >3.0 to <4.0SD	and <3.0SD	and <3.0SD
1(Borderline)	2.5 -3.5SD	and <3.0SD	and <3.0SD	and <3.0SD	and <3.0SD
0(Normal)	all <2.5 SD	and<2.5 SD	and<2.5 SD	and<2.5 SD	and<2.5 SD