Prediction of post-operative morbidity and mortality in hip fracture elderly patients

Thesis
Submitted for partial fulfillment of
Doctorate degree in Geriatric medicine and Gerontology

By

Hebattu-allah El-shazly Mohamed Zaki
Assistant lecturer of Geriatric medicine and Gerontology
Faculty of Medicine, Ain Shams University

Supervised by

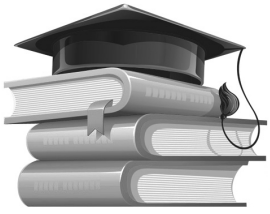
Prof. /Ahmed kamel Mortagy
Professor of Geriatric medicine and Gerontology
Faculty of Medicine, Ain Shams University

Dr. /Shereen Moustafa Mousa
Assistant professor of Geriatric medicine and Gerontology
Faculty of Medicine, Ain shams university

Dr. / Salma Samir Elsaied
Assistant professor of Geriatric medicine and Gerontology
Faculty of medicine, Ain shams university

Faculty of medicine
Ain shams university
2015

Acknowledgement



Acknowledgement

Thanks to God almighty for helping me to proceed and complete this work.

I would like to express my sincere gratitude to ***Professor / Ahmed Kamel Mortagy***, Professor of Geriatric medecine and Gerontology, Faculty of Medicine, Ain Shams University, for his great support and stimulating views.

His meticulous supervision and continuous encouragement pushed me to produce good valuable work.

A special tribute and appreciation to ***Assistant Professor / Shereen Moustafa Mousa***, Assistant Professor of Geriatric medecine and Gerontology, Faculty of Medicine, Ain Shams University, for her active guidance and supervision.

I gratefully acknowledge to ***Assistant Professor / Salma Samir Elsaied***, Assistant Professor of Geriatric medecine and Gerontology, Faculty of Medicine, Ain Shams University, for her generous help, expert advice and assistance throughout this work.

I would like to thank my whole family for their great support not only through this work but also through my whole life.

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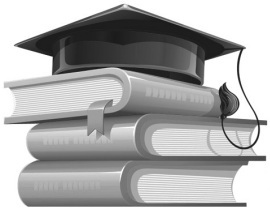

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Overview of hip fracture

Hip fractures were defined as fractures of the head, neck, pertrochanteric, and subtrochanteric regions of the femur. **(Kreisfeld and Newson 2006).**

Prevalence

Approximately 1.6 million hip fractures occur worldwide each year, by 2050 this number could triple or quadruple and reach between 4.5 and 6.3 million **(Epidemiology, costs & burden of osteoporosis in 2011 international osteoporosis foundation).**

Data on hip fracture incidence in the Middle East is scarce. There are very few population-based data, Age-standardized rates if available, were reported to vary between 250 and 350/100,000 persons per year for Lebanon, Kuwait and Iran. Lowest rates were reported in Turkey. **(Epidemiology, costs & burden of osteoporosis in 2011 international osteoporosis foundation)**.

Iran accounts for 0.85% of the global burden of hip fractures and 12.4% of the burden of hip fractures in the Middle East **(Ahmadi-Abhari et al., 2007).**

Mortality rates post-hip fracture may be higher in the Middle East Region than those reported from western populations. While such rates vary between 25-35 % in western populations, they are 2-3 fold higher in populations from the Middle East **(Epidemiology, costs & burden of osteoporosis in 2011 international osteoporosis foundation)**.

Classification

Hip fracture is classified as intracapsular (femoral neck / cervical), or as extracapsular (intertrochanteric / pertrochanteric or subtrochanteric) **(Parker and Johansen 2006)**.

Intracapsular fractures include subcapital, transcervical and basicervical fractures, and may be displaced or undisplaced. Blood loss from an intracapsular fracture at the time of injury is minimal because of the poor vascular supply at the fracture site and tamponade effected by the capsule. **(Parker and Johansen 2006).**

Healing of intracapsular fractures is complicated by the tenuous blood supply to the femoral head, the retinacular vessels that pass up the femoral capsule may be damaged, especially if the fracture is displaced. This problem does not occur in extracapsular fractures, but up to one litre of blood may be lost from fractures at this site, so fluid replacement and blood transfusion may be needed. **(Parker and Johansen 2006)**.

Etiology of Hip Fracture

The majority of hip fractures result from relatively low energy trauma due to a combination of weaker reflexes to cushion the impact of a fall and bones weakened by osteoporosis. **(Kenneth and Strauss 2009)**.

Most hip fractures result from a fall or stumble, only about 5% of cases have no history of injury. Injuries have a multifactorial origin, and they reflect increased tendency to fall, loss of protective reflexes, and reduced bone strength **(Parker and Johansen 2006)**.

Risk factors for hip fracture

Risk factors for hip fracture are divided into intrinsic and extrinsic factors.

Intrinsic Risk factors:

I. Race (Ethnicity)

White women are more likely to sustain hip fractures than are African-American or Asian women **(Ellis and Trent 2001)**.

II. Age

In both men and women, hip fracture rates increase exponentially with age. People 85 and older are 10 to 15 times more likely to sustain hip fractures than are those aged 60 to 65 fracture **(Best Practice Evidence-based Guideline prevention of Hip fracture amongst people aged 65 years and over 2003 New Zealand guidelines)**.

Age can also be an independent risk factor since older adults with normal bone mineral density (BMD) are more likely to suffer from a fracture than younger people. **(Kanis et al., 2001)**.

III. Gender

Incidence of bone fractures is found to be two to three folds higher in women as compared to men. This may be the result of that women experience a rapid phase of bone loss during the first 5-10 years after menopause, due to the loss of estrogen hormone. **(Manolagas 2000)**.

IV. Low body mass index (BMI)

Low BMI is associated with a significant increase in fracture risk in both men and women, irrespective of BMD and after adjusting for age **(De Laet et al., 2005)**.

V. Physical activity

Physical inactivity, which can lead to muscle weakness and atrophy, is also associated with an increased risk of hip fracture. **(Marks et al., 2003)**.

VI. Alcohol

Fractures are generally four times more common in alcoholic patients. The fracture risk can be explained not only by low bone mass often seen in alcoholic patients but also by accidents and falls favored by excessive alcohol consumption, independently of BMD values. **(Kanis et al., 2005)**.

VII. Smoking history

Tobacco exposes to a lower BMD, it increases the risk of fracture. Postmenopausal women and men smokers have significantly a lower bone density than non-smokers **(Kanis et al., 2005)**.

VIII. Caffeine

Excessive consumption of caffeine (>four cups of coffee/day) may be associated with a greater loss of bone mass that increases the risk of osteoporotic fracture. Caffeine decreases discreetly gastrointestinal absorption of calcium and increases its urinary excretion and is harmful to bone. **(Rapuri et al., 2001)**.

IX. Osteoporosis and falls

Compromised bone strength (osteoporosis) and falling, alone or in combination, are the two independent and immediate risk factors of elderly people's fractures through which all the other, more distant risk factors (such as ageing, inactivity, poor nutrition, smoking, use of alcohol, diseases, medications, functional impairments and disabilities) operate. Of these two, falling (rather than osteoporosis) is the strongest single risk factor for fracture **(Kannus et al., 2002)**.

X. Cognitive impairment

Significant cognitive impairment is associated with at least doubling of the risk of hip fracture in men and women. **(Best Practice Evidence-based Guideline prevention of Hip fracture amongst people aged 65 years and over 2003 New Zealand guidelines)**.

Patients diagnosed with dementia are more likely to also be diagnosed with osteoporosis, dementia sufferers are less likely to be treated with anti-osteoporosis medication prior to suffering hip fracture. **(Gleason et al., 2011)**.

Older people with dementia are at increased risk of falls and their adverse consequences. They are slower to mobilize, take more steps over a defined distance and have a greater sway path than age- and sex-matched controls. **(Shaw 2003)**.

XI. Comorbid conditions

In a 22-year follow-up prospective study, both type 1 and type 2 diabetes were associated with a significantly higher risk of hip fracture in women, the association with type 1 diabetes was stronger. **(Janghorbani 2006)**.