



Department Of Orthopaedics & Traumatology Queen Mary Hospital University Of Hong Kong Medical Centre *Newsletter*



Vol. 1, Issue 2, March 1999

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Geriatric fractures

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Aging is inevitable. It affects all tissues and particularly the bones and thus prones the elderly to a myriad of fractures among other diseases. The longevity of human beings is very remarkable, and it is posing very real challenge to the health care profession. Net resorption of minerals in bones starts from the fourth decade, causing many fractures to occur more commonly after the middle age. This will soon become a major health issue in all societies.

Osteoporosis in elderly people

Steady state equilibrium of mineral deposition and resorption in bone tissue is normally maintained in adulthood. Starting from the fourth decade, there is a net resorption, which is more dramatic at around menopause in ladies. It begins in the trabeculae and later extends to cortical bones, especially in the inner

Editors' notes

In this second issue of the Newsletter, the readers may notice the addition of "Queen Mary Hospital" and "University of Hong Kong Medical Centre" to the title of the Newsletter. The logo of Queen Mary Hospital was also added as one often relates Department of Orthopaedic Surgery at the University of Hong Kong to Queen Mary Hospital.

In the main article of this issue, Dr TL Poon wrote on the important topic of Geriatric Fractures. The readers may find the section on Pelvic Insufficiency Fractures of some special interest as this diagnosis is quite often missed and it may well be the cause of "low back

pain" in the elderly. The nurses also added their efforts and wrote on how to manage the geriatric fractures and to prevent the inherent potential complications.

Thanks to the encouraging comments from our colleagues on the premiere issue of the Department's Newsletter, we have added a new column "Letters to the Editors" to this issue. We hope to continue to receive the comments from readers. In keeping up with expanding computer technology, we now have an email account for the Newsletter. So do write, fax or email to us to express your comments.

(endosteal) surface. The result is a higher rate of fractures. The situation is enhanced by physical inactivity, multiparity, steroid taking, alcohol consumption, smoking and malnutrition (poor calcium and vitamin D intake).

Aging and menopause accounts for about 80% of all clinical osteoporosis. Osteoporosis is apparent on an X-ray. It may be measured with the more expensive or invasive techniques but the measured value is not a good predicting factor for the risk of fractures.

The effect of menopause in bones may be counteracted with hormonal replacement, dietary supplements and to a certain extent physical exercises.

Fractures in the osteoporotic limb and their management

Much of the elderly morbidity is a direct effect of a fall: this fact is crucial in the study of epidemiology and prevention of fractures.

In case of a fracture the primary aim is to restore the pre-morbid functional state. This requires always a multi-disciplinary co-ordinated effort. The choice of treatment

depends very much on the pre-existing medical conditions and other mobility factors. But if operation is contemplated it should be done as soon as possible, not only that the complications of prolonged bed rest may be minimized but also that the first two days after injury is usually when the patient is the fittest medically for operation.

Medical conditions such as cardiovascular problems or diabetes that are common in the elderly must be corrected or stabilized before operation. The universal principles of fracture treatment are not exempted here. So: reduction if necessary, immobilization if necessary, and even more significantly, rehabilitation always.

Upper Limbs Fracture

In the upper limb fractures or fracture-dislocation of the proximal humerus (Fig. 1) and fractures of the distal radius (generally lumped under the name Colles' fracture) (Fig. 2) are the most common, usually resulting from a fall in the outstretched arm. Reduction of a pure shoulder dislocation should be done extremely carefully, as a forceful manipulation will easily shatter the



Figure 1

bones. Though there is a wide choice of treatment options, the weak bone do not always accommodate strong implants or screws of external fixators.



Figure 2

Conservative or operative treatment may be chosen according to fracture configuration. However, the more osteoporotic the bones are, the less secure will be the holding of the implants. In extreme cases primary prosthetic replacement with tuberosity reconstruction is the best treatment.

The majority of distal radius fractures is treated with closed reduction under adequate anaesthesia, and plaster casting. As soon as the cast is on finger and elbow mobilization begins. Swelling leading to compartment syndrome or compression to nerves is the most dreaded complication. Some centres routinely split all casts longitudinally after application.

For all cases the most common complication is joint stiffness and careful gentle mobilization is started as soon as the patient can tolerate.

Fractures around the hip

Fractures of all regions are not uncommon but fractures around the hip are perhaps the most important fracture in the elderly. There is a great polarity between the outcomes of patients. Fortunate patients may regain most mobility and an independent life but others may only succumb after prolonged suffering from various complications of a bed-bound life.

More than 50 cases per 100,000 yearly were estimated to occur in Hong Kong, while Sweden has an incidence more

than twice as high. Some reports also expect a further 2 to 3-fold increase in the next 20 years. There is no sex preference for neck fractures but a higher incidence in female patients for intertrochanteric fractures. Urban dwellers, institutionalized people, and people with inactivity, medical conditions (diabetes, hypertension, heart failures, COAD, etc) and previous fractures are associated with a higher incidence.

The victim usually slips, and in an effort to regain balances, contracts the muscles around the hip joint, thereby generating sufficient force to fracture the femoral neck. A direct loading due to a fall may fracture the trochanteric region. After the fracture the patient is unable to stand and assumes the characteristic posture of lying down with external rotation, flexion and shortening of the affected limb.

The challenge now for the medical team is to get the patient back onto his or her feet bearing weight as soon as possible. Noting that the patient may have other medical problems like diabetes and cardiovascular diseases that needs to be stabilized, the patient may have to wait in bed for some time. During this period the patient is nursed in a position of comfort.

A femoral neck fracture may be impacted and stable. But to prevent complications in-situ internal fixation using multiple screws is usually done with good results. Displaced fractures are associated with a higher risk of non-union and avascular necrosis. Usual treatment is a primary prosthetic replacement such as the time-honoured Austin-Moore prosthesis. (Fig. 3, fig. 4) Intertrochanteric fractures must be fixed in a way to provide stability for early weight bearing. In search for an effective design, the implants have evolved over the years. Since the last decade the sliding



Figure 3



Figure 4

hip screw has become the most widely used implant. (Fig. 5, fig. 6)



Figure 5



Figure 6

Pelvic insufficiency fractures

This is a common condition but not so commonly recognized. Insufficiency fractures are caused by normal stresses on weakened bone, such as in osteoporosis. Sacral insufficiency fractures are stress fractures of the sacrum. These fractures are often missed and may well be the occult cause of "chronic low back pain" in elderly patients. Plain X-rays are often negative except that a co-existing pubic ramus fracture may be visible. Radioisotope bone scan remains the most sensitive investigation. It may show the typical H-shaped uptake pattern (Fig 7). CT scan is useful in excluding space-occupying lesions and may show up a cortical fracture in the ala of the sacrum (Fig 8). The treatment of this fracture is rest and adequate pain relief.



Figure 7



Figure 8

Geriatric fractures - Major Nursing Concerns

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Following up and rehabilitating geriatric fracture patients

Rehabilitation starts at the point of admission. While medical checkup is being done, the status before the fall is assessed. All uninjured joints are mobilized and the patient is well fed. Interestingly shown in a study done in our department the non-dominant handgrip power is the best indicator for the post-operative outcome.

In a joint effort with nurses, therapists, social worker and doctors from various departments of Queen Mary Hospital and Fung Yiu King Hospital we have developed a comprehensive programme for geriatric fracture rehabilitation. Upon exit of the programme, the patient is trained in various grades of walking and daily activities.

Right now these patients are being followed up in a very busy general clinic with long waiting time and brief interview. We have great difficulties in assessing their medical and their even more important psychosocial needs.

With good understanding of the problem neighbourhood family physicians following up patients with osteoporotic fractures are expected to provide much better care than what they are presently receiving.

Acknowledgement

We are grateful to Prof. W Peh for his assistance in providing information and diagrams of pelvic insufficiency fractures.

Osteochondroma) Multiple exostoses (diaphyseal actosis) is a common familial skeletal dysplasia. It typically affects the limbs. Growth of lesions slows as the skeleton matures. New lesions do not appear in adulthood. While the exostosis itself is histologically benign, development of secondary chondrosarcoma is a definite risk, particularly when lesions are multiple. Onset of pain or continued growth in adults, and change in appearance on serial radiographs, suggests the possibility of malignant degeneration.

ANSWER TO RADIOLOGICAL QUIZ

Geriatric hip fracture is a common problem among the elderly. As most of these patients are independent walkers before the injury, they have to adapt to the changes of being temporarily confined to bed after hospitalization. The new environment, unfamiliar faces and the uncertainty of the disease outcome, could lead to fear and anxiety. So apart from providing psychological support information is given on the hospital facilities, the ward environment, the daily routine of the ward and the peri-operative management, and are repeatedly reinforced for these elderly patients.



Respiratory problems developing before or after surgery are common in geriatric patients with fractured hips. To prevent respiratory complications, a program designed with deep breathing and coughing exercises are routinely given with supervision by the physiotherapists and the nurses.

Around 25% of these patients have Diabetes Mellitus (DM). Close monitoring of the urinary sugar and the blood glucose level are necessary. In addition, the patients' dietary intake has to be monitored closely so that the DM medications could be adjusted accordingly.

One of the common complications of geriatric hip fracture is the development of pressure ulcers associated with bed confinement. To prevent this problem, it requires multidisciplinary efforts and the co-operation of the patients. Using the Norton Scale as an assessment tool, high-risk patients are identified. Pressure ulcer prevention and management is then implemented according to the protocol. Pressure relieving devices such as special cushions, bed-paddings and heel protectors are provided. Nutritional needs and hygiene are also attended to. At the same time, the patients are encouraged to do self-lifting in bed and for those who cannot lift themselves, regular turning is assisted by the nursing staffs. On the other hand, early surgical intervention allows the patient to get out of bed and walk sooner, thus reducing the period of immobility. With an additional operation session, the trauma list, the waiting time for operation has been decreased remarkably. With concerted efforts, from May to December 1998, among the 66 geriatric hip fracture patients, only two (3.03%) developed pressure sore.

With the aging population, more geriatric hip fractures are anticipated. Therefore, an orthopaedic nurse has to possess the knowledge, skill and experience not only to take care of the fractures, but also the elderly patients.



By Dr William Lu
Assistant Professor (Research);
Dr Kenneth Cheung
Associate Professor

Fractures in mice help to understand the way bone repairs in humans

In a Research Grants Council funded project, Dr. Kenneth Cheung is examining the possible role of a little known collagen, collagen type X, in the development of fracture non-union. There is some evidence from human studies that collagen type X is required for the normal repair of fractures, and that its absence can lead to non-union.

One way to test this hypothesis is to create a mouse model in which the collagen type X gene is deleted, thus no collagen type X is produced by any of the mouse tissues. Femoral fractures are created in these mice and fixed using an external fixator (see photograph). The fractures are then studied radiologically, mechanically and histologically, and

compared with fractures in normal mice. To date, we have found definite abnormalities in the mice with collagen type X deficiency, suggesting that collagen type X does play a significant role in fracture healing.

Creating mouse models of human conditions using gene knockout / transgenic technology is a new research tool which is likely to become increasingly useful in future.



Picture showing the experiment mouse

News in Flash

- Congratulations to the mighty efforts of Dr Chow Wang and Dr Kwok Hau-yan, medical officers in our department who both obtained the gold medal in the Exit Examination of the Hong Kong College of Orthopaedic Surgeons in December 1998. The gold medal has been donated by Professor Sir Harry S Y Fang, and is awarded to the candidate with the most outstanding performance in the examination.
- The Department has always been the centre of excellence in research. Professor Keith Luk and co-investigators recently received a Vice-Chancellor's "Outstanding Researcher Award" and an Earmarked Research Grants 1998-99 of HK\$1,434,000 from the Hong Kong Research Grants Council (RGC) in their project "A minimal invasive approach to anterior release in scoliosis by chemonucleolysis: an experimental study with the rabbit scoliosis model".
- Our only female doctor in the Department, Dr WY Ip, also received the 1998/99 Large Items of Equipment grant of HK\$477,000 to purchase the Dexter Hand Centre to allow better assessment of hand function. A hearty congratulation to both Professor Luk and Dr WY Ip!

Radiographic Quiz

By Professor Wilfred Peh
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PRESENTATION

A 19 year old girl presenting with left knee pain. What do frontal and lateral radiographs of the left knee show? What is the significance of these findings?



Letters to the Editors

We have received some favourable comments from our friends and colleagues on the premiere issue of the Newsletter.

Dr Tsoi Wai-wang, Gene, wrote to Professor John Leong congratulating the Department on the launch of the Newsletter. Dr Tsoi also commended on the article about the revision of total joint replacement by Dr Peter Chiu and wrote,

"I hope the topics of future issues will be chosen along this line of thought. This is where we have been neglected by the other specialties over the

decades - an orientation towards joint management with primary care providers."

We have responded to Dr Tsoi with "Geriatric Fractures" included as the main theme for this issue and we hope the readers find this issue of some use when facing this common problem of the elderly.

Dr W.S. Fernando suggested that we should include the month and year for each issue in the masthead of the Newsletter. I think Dr Fernando should have noticed we have done so in this issue. Thanks for the advice.