



Department of Orthopaedic Surgery The University of Hong Kong

Newsletter

Volume 1, Issue 1

Editorial Board

Dr Kenneth Cheung
(Associate Professor)

Dr T.L. Poon
(Consultant)

Dr Jimmy Wong
(Senior Medical Officer)

Ms Teresa Li
(Department Operations Manager)

C/o Department of Orthopaedic Surgery,
5/F Professorial Block, Queen Mary Hospital,
Pokfulam, Hong Kong. Fax 28174392



Prof. J.C.Y. Leong

Head,
Department of Orthopaedic Surgery
The University of Hong Kong

A university clinical department exists not only to provide top-class patient care, but also to teach undergraduates and postgraduates, and to pursue cutting-edge research. In today's world of knowledge explosion, there is yet another important function for us, and that is to disseminate recent advances in medical science and treatment to our colleagues who are within or without the same field.

Although there are medical journals abound dealing with musculoskeletal problems, the busy medical practitioner, especially if not practising in the same discipline, finds it virtually impossible to keep abreast of new developments. We can help to digest the new developments, and provide periodic abstemious doses to our readers.

It is with this intention that our Department has decided to publish a regular Newsletter. We hope that you will enjoy perusing it, and furthermore we hope you will interact with us by writing back to our Editors on any point you feel important.

The Editors are chosen from our "younger" staff to give the Newsletter vitality and drive.

Editors' notes

"Why newsletter?" One may ask. The Department hopes that through this periodic Newsletter, it brings stronger ties to the medical community and helps raise interest in orthopaedic problems in general. In each issue we will have a main article on an important orthopaedic topic. In this premiere issue, Dr K. Y. Chiu writes the main article on the important topic "revision of total hip replacement" which is now becoming more and more common as the original total hip replacements may have been done many years ago and the patients now outlive them. There is also comment from the nurses' point of view on the subject, concentrating on the perioperative care and the rehabilitation. Professor Wilfred Peh, our honorary contributor from the Department of Radiology at Queen Mary Hospital with special interest in the musculo-skeletal system, gives us the radiological quiz and the readers can find the answers to the quiz in this same issue. The editors would like to have a column "Letters to the editors" in the next issue of the Newsletter and would welcome any comments from the readers. We hope that the readers will find this premiere issue of the Newsletter an enjoyable reading.

Revision

Total Hip Replacement

K Y Chiu

Associate Professor & Chief,
Division of Joint Replacement Surgery,
Department of Orthopaedic Surgery,
The University of Hong Kong

Introduction

Total hip replacement is probably the most successful of all elective, major surgical operations. It alleviates pain and improves the function of patients who have badly damaged hip joints. At the beginning, total hip replacement was performed only for old patients who were relatively inactive. The indication was then extended to younger, more active patients. It is estimated that there are over 800,000 hip replacements each year over the world.

It is important to realise that total hip replacement is an operation with a finite service life. Cemented hip replacements, using early techniques, had increased loosening rate after 5 to 10 years (Figure 1). Improved cementing techniques gave better results, but the durability in relatively young and active patient is still being questioned.



Figure 1

Loosening of
cemented
hip replacement

Cementless hip replacement theoretically gives more durable fixation. However, wear problem, especially that of polyethylene, occurs. The particulate debris that is generated can cause osteolysis as early as 5 to 7 years after a hip replacement (Figure 2). Ways to minimise the wear problem are being explored, but solid evidence that any of these can solve the problem is still awaited.

It is highly likely that today's joint replacement will fail in time. As the number of primary hip replacement increases with increasing demands from the patients, there comes a greater requirement for revision operations.



Figure 2 Pelvic osteolysis after cementless replacement

Revision total hip replacement

Revision surgery involves removal of the failed components together with cement if it was used, the insertion of new components with stable prosthesis-bone interface, and the restoration of the normal anatomy.

Revision surgery is much more difficult and hazardous to do than primary cases. The scarring after the previous operation distorts the anatomy and makes surgical approach more difficult. In addition, the latter has to be more generous to give wide exposure. The removal of cement and old implants can be difficult, and additional damage to the already compromised bone commonly occurs during this process. Perhaps the most important factor is the severity of the bone defects. Loss of bone stock is always present in revision surgery, and is detrimental for any form of fixing the prosthetic components. One may not be able to use conventional components, and allografts are commonly used to repair the defects.

Since the surgery is more extensive, it is more time consuming, with increased blood loss and higher complication rates. For example, the infection rate is much higher than in primary operation, and it is thus important to provide full protection - prophylactic antibiotics, laminar air-flow and body-exhaust system (Figure 3).



Figure 3 Operating theatre set-up during revision surgery at Queen Mary Hospital

The techniques in revision surgery has advanced significantly in the past 5 to 10 years. Surgical instrumentation has been developed to facilitate removal of failed implant and cement. The implants are now better designed to suit the revision situation. We also know better about the application of allograft in revision total hip replacement.

Instrumentation

Manual removal of cement is a tedious and difficult task. Precious bone stock can be further jeopardised with chiselling and reaming, and perforations and even fracture of the femoral shaft are not uncommon even in experienced hands. In Queen Mary Hospital, we have the state-of-the-art special equipment available to facilitate the removal of cement.

The use of Midas Rex dissecting tools under fluoroscopic guidance facilitates the task. Midas Rex is a set of pneumatic driven dissecting tools. It is very powerful and can cut and dissect bone, cement, plastics and metal in great speed. The main disadvantage of it is the price. Inadvertent perforation of the cortex may still occur with this technique, especially at areas when the bone is severely thinned out.

The second method makes use of new cement to bond to the old mantle, and then uses specially designed instruments to extract the cement mantle (old and new together) in short segments (Figure 4).



Figure 4 Segmental extraction of cement mantle

The third method is to use ultrasonic instruments that can melt the cement and then scoop it out, without damaging the host bone. It is again very expensive, and it serves one purpose but nothing else. However, this is perhaps the most useful weapon in revising a failed, cemented hip replacement.

It is also possible to expose the canal widely by splitting the proximal femur or doing an



Figure 5 A big cavitory defect after loosening of the cemented cup was reconstructed with a cementless cup together with morsellised allograft.

extended trochanteric osteotomy. However, special implants may be needed afterwards.

Implants

A much wider range of prostheses must be available. Sometimes the choice of prosthesis is a matter of the surgeon's own preference. Not uncommonly, the use of special prosthesis is determined by the approach employed, the severity of the bone defect and the patient characteristics. For example, if distal cement has to be removed using a cortical window, a long stem must be used to bypass the stress-riser effect of the cortical window. A even longer stem may be needed if a massive allograft is required to reconstruct the proximal femur.

In Queen Mary Hospital, we prefer cementless revision in the acetabular side, with or without allograft augmentation (Figure 5). Cementless cup of much bigger size may be needed. The key to success is the support of the cementless cup by host bone. If host bone contact is not certain, anti-protrusion cage with bone grafting will be used to reconstruct the acetabulum.

For the femoral side, we use mainly extensively porous-coated stem for young patients. For selected patients with an excavated proximal femur, we use the impaction bone grafting technique with the Charnley stem (Figure 6). The allograft is firmly impacted with special instruments and then a cemented stem is implanted. It has the advantage of improving the bone stock and has recently aroused a lot of interest all over the world. For old patients with reasonable bone stock, cemented Charnley stem is used. For the severe defects, we use a long-stem Charnley with a massive proximal femoral allograft.

We also found the Dall-Miles cable system very useful in revision situations. It is rather expensive, but the rigid fixation of crack, fracture or osteotomy permit the patient to be mobilised in the same way as after a primary operation.

Allograft

Allograft has been used to reconstruct bone defects in revision surgery. It is now realised that massive, structural acetabular allograft



Figure 6 The use of impaction bone grafting technique to revise a grossly loosened femoral stem.

does not work well if the component is covered mainly by allograft, without being adequately supported by host bone. On the other hand, bone graft may potentially

improve the bone stock, and is therefore attractive especially for young patients. In Queen Mary Hospital, we are backed up by a well-established bone bank. We use mostly morsellised allograft together with a porous-coated cup in the acetabular side. In the femoral side, cortical strut grafts are employed to bypass weak areas over the proximal femur. For selected patients, we employ the impaction bone grafting technique as mentioned above. Block grafts are used occasionally for segmental acetabular defects, and massive allografts are used for severe proximal femoral defects. If porous-coated components are used, it is important to maximise contact with host bone.

Status in Queen Mary Hospital

There is a strong argument of revision total hip replacement to be carried out in specific centres. The techniques of revision surgery are demanding, and a wide range of instruments and prostheses are needed. Revision surgery should not be performed by someone who only occasionally revise a few hips.

In Queen Mary Hospital, **Division of Joint Replacement Surgery** was formed in March 1997. All total hip replacements, primary or revision, are under the care of this dedicated team of surgeons. Experience accumulates much quicker and easier with this unique arrangement. In addition, we have all the special equipment and the support of a bone bank as mentioned above. Mostly importantly, the members are all motivated and interested in taking up the difficult but challenging task of revising failed hip replacements.

Education Program for Patients with Joint Replacement

By M.F. Hui, J. Ng, T. Li
Nursing Officers
Dept of Orthopaedic Surgery
Queen Mary Hospital



It is well known and agreed that pre-operative education helps prevent complication, speeds up rehabilitation and promotes better outcomes after surgery. It is no exception for patients with total joint replacement.

To standardize the content of the patient education program, the nursing staff of A4 ward (one of the Orthopaedic wards in Queen Mary Hospital) has designed an education kit in which the information is illustrated with photographs to facilitate easy understanding.

The kit is in two parts. The first part provides general information on the ward environment, general investigations and pre-operative preparations. The second part focuses on the operation that the patients will have, paying special emphasis on the precautions in the activities of daily living in order to avoid complications.

The named nurse is responsible for the patient education. It is provided during the work-up stage and once again during the pre-operative

stage. In addition, a checklist is used to ensure that all the essential information is given to the patients during each education session and necessary reinforcement is given as required during the post-operative period.

This program has been running for nearly a year and we plan to solicit opinions and feedback from the discharged patients on the education program so that our objective of quality outcomes could be achieved through continuous improvement.

Simple bone cyst with pathological fracture. The metaphyseal region of the proximal humerus is a common site for simple bone cyst. Cortical fragments are seen at the bottom of this fluid-filled lesion - the "fallen fragment" sign. It is virtually pathognomonic of this lesion.

By **Dr William Lu**
Assistant Professor (Research)

A comprehensive, objective study of the cause, effect and methods of prevention of Occupationally-Related Low Back Injury

Low back pain (LBP) has become one of the most distressing human problems. In the United States, there are 75 million work days lost to back injuries with US\$25 billion paid in workers' compensation each year. In Hong Kong, the compensation for occupational related injuries cost HK\$675 million in 1993. Noteworthy is within the injured employees, the professional, technical or administrative related workers increased more than 100% in the last ten years.

It is believed that occupational-related back pain is multi-factorial in origin. It is related to posture, work-site ergonomics, physical stress, acute and repetitive trauma, physical fitness and body-awareness. Psychosocial factors also play some important roles in LBP. Thus, there is a need for accurate assessment of functional impairment, disability and pain so that effective treatment and prevention strategies may be proposed and implemented. The Department of Orthopaedic Surgery has set up at The Duchess of Kent Hospital a Spine Centre for the evaluation and treatment of both adult and children spinal disorders. A total of HK\$ 1.5 million has been made available by the hospital for the physical refurbishment, and a further HK\$ 1 million from the Chinese Permanent Cemeteries Fund and private donations for purchasing essential assessment and treatment equipment. Recently, a RGC research grant of HK\$700,000 was awarded for combined multi-disciplinary approach to evaluate LBP.

The first aim of the study is to develop a system of multidisciplinary objective assessment of impairment, taking into account the multifactorial causes of LBP. The assessment method is correlated with a number of outcome criteria including return to work, pain, patient satisfaction, etc. The second aim of the study is to address the equally important question of prevention by an in-depth analysis of the mechanisms of injury through biomechanical studies, and the establishment of safety standards relevant to the Asian population.

By **Professor Wilfred Peh**
Department of Radiology, Queen Mary Hospital

This is the X-ray of a 12-year old boy who presents with pain and swelling over the right shoulder following a fall. What is the likely diagnosis?



Picture showing In-vitro Lumbar Spine Testing

News in Flash

- Congratulations to Dr T.L. Poon who has been recently promoted to Consultant grade. Dr Poon is now the consultant in charge for the orthopaedic trauma service in the Department.
- Telemedicine consultation between The University of Hong Kong and other international centres is now made possible via video conferencing. A recent video conference was held between the Department and Sun Yat Sen First Affiliated Hospital in China on 13th Feb 1998. More video conferences are expected in the future.