

Effectiveness of a multidisciplinary approach to geriatric hip fractures in improving clinical outcomes and cost of care

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KEY MESSAGES

1. Geriatric hip fracture is best managed by a multidisciplinary geriatric hip fracture clinical pathway (GHFCP).
2. Implementation of a GHFCP results in decreased preoperative waiting time and length of hospital stay, decreased mortality and complication rate, reduced manpower cost, and increased efficiency.

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Introduction

Geriatric hip fracture is placing an increasing burden on our medical system and requires increased health utilisation in the first year of fracture.^{1,2} A multidisciplinary approach in the form of a critical clinical pathway has been reported to shorten hospital stay and improve clinical outcomes.^{3,4} In 2007, we developed our own geriatric hip fracture clinical pathway (GHFCP) to meet the local medical system needs. The initial results were encouraging with a shortened length of hospital stay. Nonetheless, the improved clinical outcomes with the multidisciplinary approach were at the expense of higher manpower costs. We conducted this retrospective study to compare clinical outcomes and manpower costs before and after implementation of the GHFCP.

Methodology

The GHFCP is a multidisciplinary care model that addresses all phases of management including preoperative, peri-operative, postoperative, and rehabilitation periods. The team is led by an experienced orthopaedic surgeon. A full-time nurse acts as a case manager to help monitor the daily routine of clinical management and the flow of patients. The team includes surgeons, physicians, anaesthetists, nurses, physiotherapists, occupational therapists, medical social workers, and voluntary support groups. They contribute at various times to the management programme.

Hip fracture data in 2006 were compared with those from 2008 to 2011. Efficiency of the programme

was indicated by the preoperative length of stay and total length of stay in acute and convalescence hospitals. Clinical outcomes included short-term and long-term mortality rates and complication rates. Cost of manpower was estimated.

Results

After implementation of the GHFCP, the preoperative length of stay shortened from 5.76 days in 2006 to 1.32 days in 2011 ($P < 0.001$, Fig 1). The total length of stay in both acute and convalescence hospitals was also shortened by 6.05 and 14.24 days, respectively. The postoperative pneumonia rate decreased from 1.25% to 0.25%. In 2006, the in-patient mortality, 30-day mortality, and 1-year mortality were 2.86%, 5.36%, and 23.93%, respectively. In 2011, the respective rates decreased to 0.95%, 1.67% (Fig 2), and 13.81%. Although health manpower had increased to meet the increasing workload, the shortened length of stay contributed to a marked decrease in the manpower costs per hip fracture case. In 2006, the average staff cost for each geriatric hip fracture patient was HK\$23 907. After implementation of the GHFCP, the average staff cost for each geriatric hip fracture patient was HK\$16 598 in 2008 and HK\$16 190 (lowest) in 2010. There was a general downward trend, but the cost fluctuated slightly depending on the number of hip fracture patients and the average length of stay (Fig 3).

Discussion

Compared with other pathways,^{3,4} our GHFCP extends from the acute hospital to the rehabilitation

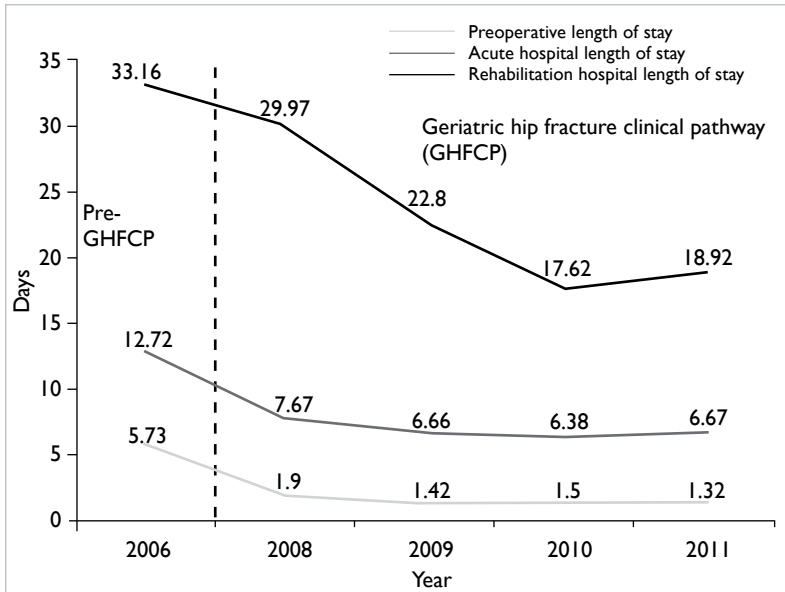


FIG 1. Length of hospital stay from 2006 to 2011

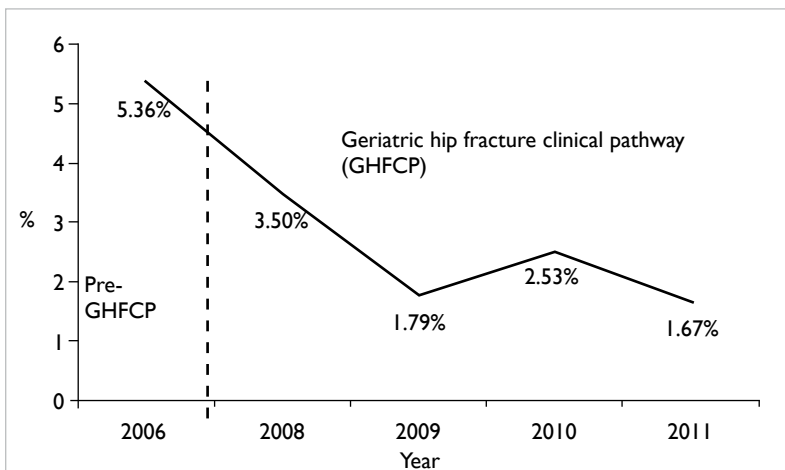


FIG 2. 30-day mortality from 2006 to 2011

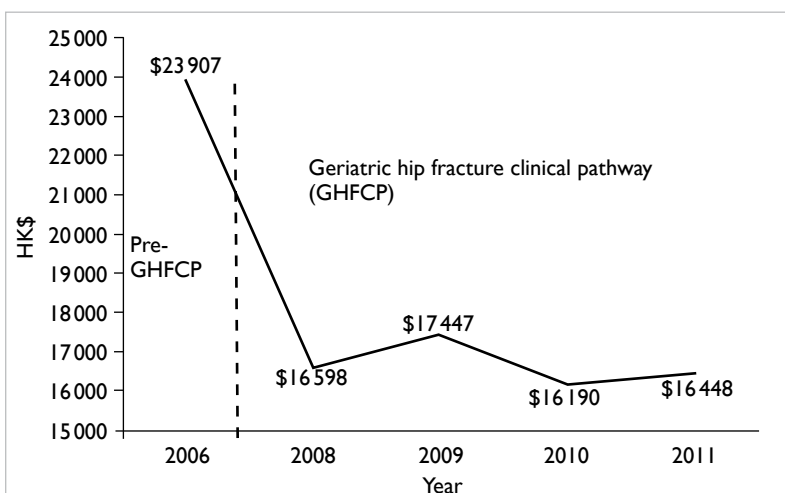


FIG 3. Average staff cost per geriatric hip fracture patient in Queen Mary Hospital from 2006 to 2011

hospital and ensures smooth transition along the whole chain of clinical care. The preoperative length of stay is an important factor that affects the clinical outcomes of hip fracture patients. The shorter the stay, the fewer the complications and the lower the mortality.⁵ Our GHFCP significantly decreased the preoperative length of stay from 5.76 days in 2006 to 1.32 days in 2011. This was attributed to the joint efforts of the surgeons, physicians, anaesthetists, and nurses, including the operating theatre personnel. A standardised protocol is followed to ensure most hip fracture patients undergo surgery within 48 hours of admission. The total length of stay in hospital is significantly shortened. In the rehabilitation hospital, the rehabilitation doctors, nurses, and particularly therapists and medical social workers work together to speed up the rehabilitation process. The length of stay in the convalescent hospital is also significantly shortened, and patient satisfaction improved.

In our study, the in-patient mortality gradually decreased from 2.86% in 2006 to 0.95% in 2011, and the 30-day mortality from 5.36% to 1.67%. Our 30-day mortality is much lower than that reported in other studies ranging from 5.1% to 13%,³⁻⁵ particularly after the GHFCP. In addition, the 1-year mortality showed a decreasing trend. This was not expected because most of these 1-year mortalities were not directly related to hip fracture.

It is difficult to calculate every single cost of item and manpower, as medical care in Hong Kong is public health care. The medical staff is paid a monthly salary irrespective of the number of patients operated on or treated. The costs of hardware such as medications, implants, prostheses, and consumables are standardised and purchased by the hospital management. After implementation of the GHFCP, the only resource that increased is manpower, especially in allied health staff, namely physiotherapists, occupational therapists, and medical social workers. The numbers of surgeons, physicians, anaesthetists, and nurses remain unchanged; instead the care system is improved so that these people work more efficiently. There is a generally decreasing trend in the cost of care in the acute hospital because the length of hospital stay is much shorter following introduction of the GHFCP. The increased allied health manpower costs are compensated by the drastically decreased length of stay. Although this reduced cost is not reflected by actual reduced expenditure in hospital, it proves that increased manpower is cost-effective in treating geriatric hip fractures, and that good-quality care does not necessarily need to increase costs.

There is also a reduction in costs in the convalescence hospital. In the initial phase of the GHFCP, allied health manpower in Fung Yiu King Hospital was increased to support the extra workload. Nonetheless, the cost of each patient

has since decreased due to the much shorter length of hospital stay. Once the programme operated smoothly, manpower demand decreased slightly and results remained consistent, although one reason for decreased manpower was manpower shortage.

This study had several limitations. It had confounding factors that are associated with a retrospective cohort study. Nevertheless, the patients in the two cohorts were comparable in terms of demographics. The cohort before implementation of the GHFCP consisted of 2006 data only. More data before the GHFCP would have been better, but 1-year data were representative of the scenario before the GHFCP.

Conclusions

The GHFCP has shortened geriatric hip fracture patients' length of stay and improved clinical outcomes. It is cost-effective and proves that better care can be less costly. The GHFCP improves clinical outcomes of hip fractures in terms of mortality and complication rates. A preoperative waiting time of <48 hours should be the standard of care for all geriatric hip fractures. Investment in manpower to manage geriatric hip fracture is cost-effective because it achieves a more efficient system of care and shorter length of stay in both acute and convalescence hospitals. A larger-scale, prospective study is required to prove the efficacy of the multidisciplinary approach to geriatric hip

fractures, and to determine factors that affect clinical outcomes.

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References

1. Brainsky A, Glick H, Lydick E, et al. The economic cost of hip fractures in community-dwelling older adults: a prospective study. *J Am Geriatr Soc* 1997;45:281-7.
2. Johnell O, Kanis J. Epidemiology of osteoporotic fractures. *Osteoporos Int* 2005;16(Suppl 2):S3-7.
3. Gholve PA, Kosygan KP, Sturdee SW, Faraj AA. Multidisciplinary integrated care pathway for fractured neck of femur. A prospective trial with improved outcome. *Injury* 2005;36:93-9.
4. Choong PF, Langford AK, Dowsey MM, Santamaria NM. Clinical pathway for fractured neck of femur: a prospective, controlled study. *Med J Aust* 2000;172:423-6.
5. Roche JJ, Wenn RT, Sahota O, Moran CG. Effect of comorbidities and postoperative complications on mortality after hip fracture in elderly people: prospective observational cohort study. *BMJ* 2005;331:1374.