Sundhedsstyrelsen
Danish Health and Medicines Authority

SYSTEMATIC PREVENTION AND TREATMENT OF OSTEOPOROSIS IN PATIENTS WITH HIP FRACTURES

– a health technology assessment
Summary

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The English summary can be downloaded at www.dacehta.dk

What is Health Technology Assessment?

Health Technology Assessment (HTA) contributes to decision making in the health care sector. A HTA collects and assess existing knowledge about a given health technology. A health technology is defined broadly as procedures and methods for prevention, diagnostics, treatment, care and rehabilitation including devices and medicine. An example could be a new method to treat patients. Focus is on healthcare, patient, organisational and economical aspects. New research can be conducted if the number of sufficient studies is limited to elucidate one or more of these aspects.

The HTA results in a report that can contribute to better planning, quality enhancement and prioritizing in the health care sector. The target group is decision-makers in the health political field. The primary users are therefore administrations and politicians and other decision-makers in the health political field. The HTA contributes to decisions within administration as well as political management as to which services should be offered in the health care sector and how they should be organized.

Health technology assessment is defined as:

- HTA is a comprehensive systematic assessment of the prerequisites and consequences of applying a health technology
- HTA is a research-based, application-oriented assessment of relevant existing knowledge about problem areas applying a technology within the field of health and illness.

The project is funded by a HTA-fund that was terminated in 2007. The purpose of the fund was to spread out knowledge and use of HTA locally. The funded HTA-reports are prepared in collaboration with an external interdisciplinary project group. The project group systematically reviews the existing literature, contributes with data collection and produces the chapters and conclusions of the report. The project management is placed at the National Board of Health who is also responsible for the editing of the final report. The report has been submitted to an external reference group and is also externally peer-reviewed.

Find more information about HTA at www.sst.dk/mtv under HTA toolbox:
“Handbook of Methods for Health Technology Assessment”
“Health Technology Assessment – Why? What? When? How?”

Summary

Introduction

In Denmark, approximately 11,000 patients are hospitalized with hip fracture each year. Most of these patients (approximately 85 %) also have osteoporosis and have a very high risk of new fractures. Within one year, 9 % will suffer a new hip fracture and 36 % will suffer a fracture in another part of the body. After five years, 20 % will have suffered a new hip fracture and 57 % another fracture. However, only approximately 9 % of women and 4 % of men with previous hip fracture receive treatment for osteoporosis. Most of the new fractures occur with such a delay that preventive medication may be effective if it is initiated at the time of hip fracture or within a few months.

Medication such as calcium and vitamin D, bisphosphonates (e.g. alendronate, risedronate, zoledronic acid) and denosumab, reduce the risk of hip fractures and of vertebral and other fractures.

Aim

The aim of this heath technology assessment (HTA) is to describe the factors and issues that should be considered if a systematic program of diagnostic work-up and treatment of osteoporosis is to be offered to patients with hip fracture.

Target audience

The report is aimed primarily at decision-makers in the health care system (senior physicians, senior nurses and hospital directors), who are responsible for organisation of services to patients with hip fracture. The report is also written for doctors and other health personnel involved in the planning and monitoring of patient programs for hip fracture.

Scope

The report focuses on hip fractures from low-energy trauma (e.g. falls). Hip fractures also occur as a result of high-energy trauma (e.g. traffic accidents) or in patients with other bone diseases such as cancer and rare hereditary conditions. These comprise less than 5 % of cases, however, and are not addressed in this report.

Patients with hip fracture are mostly very elderly, often have significant comorbidity with use of a large number of medicines and frequently have poor nutrition. Other interventions such as intensive rehabilitation programs, fall prevention and the use of hip protectors are not discussed in this report.

Methods

The report is based primarily on a review of the scientific literature and an experimental study where a Fracture Prevention Program was implemented in two hospitals – Hospital of Southwest Denmark, Esbjerg, and Odense University Hospital.

The project group has also performed a historical cohort study on patients with hip fracture, using national patient databases to examine the risk of further fractures.

Furthermore, our experience with organizing and implementing the Fracture Prevention Program is described.

Epidemiological data were retrieved from our cohort study, while data on resource use were collected from the case record files, the patient administrative system and the published literature. These data were entered into a simulation model to assess the possible economic consequences of implementing a program for the systematic diagnosis and treatment of osteoporosis in patients with hip fracture.

Technology

Bone scans (DXA), spinal X-ray, an array of blood tests and clinical examination by a medical doctor are necessary to diagnose and determine the severity of osteoporosis, while also excluding a number of other diseases that may mimic osteoporosis in patients with hip fracture.

A range of different programs for systematic diagnosis and treatment of osteoporosis in patients with prior fractures has been tested internationally, and a few programs have been tested in Denmark.

The least ambitious programs comprise mailing information to the general practitioner at the time of discharge of fracture patients from the emergency room.

The most ambitious programs involve a nurse with special responsibility for identifying, informing and teaching patients, as well as for coordinating bone scans, spinal X-rays and blood tests followed by a medical consultation with possible prescription of medication and follow-up.

Fracture Prevention Programs have to date been implemented in only a few Danish hospitals, either as stand-alone programs or incorporated into team-based orthogeriatric services. In other Danish hospitals, a Fracture Prevention Programs would be a new provision and thus would not replace existing services.

Patients

Patients with hip fractures experience a considerable decline in health-related quality of life for several years after the fracture and this is further reduced in those patients suffering new fractures.

The implementation of a Fracture Prevention Programs markedly increases patients' acceptance of diagnostic and therapeutic services for osteoporosis. This is documented in both randomised studies (where patients have been randomly allocated to two alternative interventions) and cohort studies (where groups of patients have been followed over time).

No specific Fracture Prevention Program has been documented as being the most effective approach; however, appointment of a coordinator (e.g. a nurse) with specific responsibility for assessment and referral of patients to bone scanning is crucial for success. Guidelines or educational programs aimed at doctors, other health personnel or patients are alone ineffective in reducing the risk of future fractures. In contrast, cohort studies and a single randomised controlled trial have demonstrated that Fracture Prevention Programs increase uptake of DXA and drug treatment of osteoporosis and

are thus likely to reduce the occurrence of further fractures; none of these studies had fractures as their primary outcome, however.

Approximately 30 % of patients with hip fracture do not benefit from Fracture Prevention Programs. These are patients with severe comorbidity (i.e. short expected life expectancy), dementia and with fractures due to high-energy trauma or metastatic bone disease.

Patients do typically not cope well with other problems or issues immediately after a hip fracture. It is thus appropriate to postpone participation in Fracture Prevention Programs for a few weeks or months.

Of the patients with hip fracture who are invited to the Fracture Prevention Program, approximately 42 % (i.e. 28 % of all patients with hip fracture) will begin specific osteoporosis medication. In this group, adherence to medication is similar to that of other patients with osteoporosis, i.e. approximately 70 % after two years.

No data are available regarding the effect of Fracture Prevention Programs on health-related quality of life. Such programs can prevent a significant number of future fractures, however, it is likely that they will decrease mortality from new hip fractures and avoid the detrimental effects of hip and vertebral fractures on health related quality of life.

No data are available regarding patient satisfaction with the provision of a Fracture Prevention Program. In our experience, however, patient satisfaction with the program offered appeared to be similar to that with other health services.

Organisation

A Fracture Prevention Program can in principle be implemented in any department of orthopaedic surgery that provides services to patients with hip fractures. In those (few) departments that have already established team-based orthogeriatric services, it would be sufficient to adjust the current management programs, e.g. to include bone scans and specific drug therapy.

Structural changes within a department should not be necessary for the implementation of a Fracture Prevention Program, but some working procedures would need to be altered. The department of orthopaedic surgery could choose to appoint a nurse who would have special responsibility for ensuring that all relevant patients were invited into the program. The clinics providing bone scans would need to plan the scanning so as to minimise the number of visits made by each patient and to avoid early morning or late afternoon appointments as most patients would require assisted transport. Geriatric and medical outpatient clinics would need to make similar considerations.

The prerequisites for successful implementation of a Fracture Prevention Program (i.e. personnel and equipment) should be available in many Danish hospitals, although there may be a need for some adjustment of clinical pathways and further staff training. These should mostly be possible within existing frameworks.

Hospital managers and heads of clinical departments are key stakeholders in the implementation of a Fracture Prevention Program. It is recommended that a “program leader” (typically a consultant physician) is given responsibility for managing the program

and that a nurse in the orthopaedic surgery department is delegated with special responsibility for identifying, informing and referring patients.

In most clinics providing bone scans, a Fracture Prevention Program can be incorporated without requiring new resources, especially if the program is phased in gradually. Purchase of new equipment may be necessary in some cases, but the expense per patient is low. In a large hospital (e.g. with 500 hip fracture cases per year), the staffs needed is likely to comprise 0.4 doctors, 0.5 technicians, 0.4 nurses and 0.2 secretaries.

If Fracture Prevention Programs were implemented nationwide in Denmark, a maximum volume of 4,200 patients scanned per year may be anticipated. In such a case, follow-up (e.g. after two years) could be performed by general practitioners.

Economics

A hip fracture incurs health care costs related to hospital stay, surgical treatment and rehabilitation amounting to approximately DKr. 96,000 during the first year and DKr. 280,000 during the first ten years. The total costs of a Fracture Prevention Program are estimated to be DKr. 6,300 per patient. It is probable that the program (if fully implemented) would prevent 224 hip fractures and 61 deaths per year. On the basis of an economic model with conservative assumptions, the proposed program would be cost-neutral from the viewpoint of the health care service system.

Medication costs comprise approximately half the total cost of a Fracture Prevention Program. Access to affordable, non-patented drugs and restricted use of expensive drugs would increase the cost-effectiveness of the program.

Overall assessment

Nationwide implementation of Fracture Prevention Programs should be considered in Denmark to ensure that all patients with hip fracture are offered diagnosis and treatment for osteoporosis.

Such programs could be designed using the data and experiences outlined in this report. It should be continuously monitored, evaluated and adjusted as necessary.

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