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Economic evaluation of kyphoplasty☆

Évaluation économique de la cyphoplastie

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Summary

Objectives. Without any refund of medical costs and with a high cost of products, an economic study has been conducted to compare the spendings and receipts of the hospital for a kyphoplasty.

Methods. The patients included in the survey were treated for kyphoplasty between January 2008 and December 2010. We took into account only direct medical costs: costs of products and hospitalization assessed by three methods [analytical accounting, French public Diagnosed-Related Group (DRG), and DRG adapted to the mean time of the hospitalization].

Results and discussion. One hundred and two patients were enrolled in our study: 61% with vertebral compression fractures due to osteoporosis, 22% due to trauma, and 17% due to malignant disease. The patient stays are distributed in 17 DRG, with an average length of stay of 9.4 ± 10.0 days. For every hospitalization stay, the hospital gets 3740€ ± 2611. The average spendings are estimated at 9033€ by the analytical accounting, at 7679€ by DRG, and at 4548€ by DRG adapted to the mean time of the hospitalization. The average costs of products by procedure are 3930€, that is, 105% of

Résumé

Objectif. En l'absence d'acte spécifique et devant un coût élevé en dispositif médical (DM), une étude économique a été réalisée pour comparer les dépenses engagées aux recettes perçues par l'hôpital dans le cadre d'une cyphoplastie.

Méthode. Les patients traités entre janvier 2008 et décembre 2010 par cyphoplastie ont été inclus. Seuls les coûts médicaux directs ont été identifiés puis valorisés (2010) : dispositifs médicaux, hospitalisations (valorisés par trois méthodes : comptabilité analytique (CA), échelle nationale des coûts (ENC) et ENC réajusté à la durée moyenne de séjour). La recette perçue par l'hôpital est obtenue via les Groupes Homogène de Séjour.

Résultats et discussion. Sur 102 patients inclus, 61 % ont été traités pour FTV ostéoporotique, 22 % pour FTV traumatique et 17 % pour FTV néoplasique. Les séjours étaient répartis dans 17 GHM, avec une durée moyenne de 9,4 ± 10,0 jours. L'hôpital a perçu en moyenne 3740 ± 2611 € pour chacun des séjours. Les dépenses estimées par la CA locale s'élevaient à 9033 €, à 7679 € par l'ENC et à 4548 € par l'ENC réajusté ($p < 10^{-3}$). Le coût moyen

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the hospitals' receipts. For each kyphoplasty, these receipts are not sufficient to balance the hospital's book.

Keywords: Kyphoplasty, Vertebral compression fracture, Hospital costs, Prospective payment system, Vexim

en DM était de 3930 € soit 105 % de la recette perçue par l'hôpital. Les sommes engagées par l'hôpital à chaque cyphoplastie ne sont pas couvertes par les recettes perçues.

Mots clés : Cyphoplastie, Fracture tassement vertébral, Coûts hospitaliers, Tarification à l'activité

Introduction

The pains related to the vertebral compression fractures (VCF), whatever is their origin, have an impact on the quality of life and the survival of patients [1]. The technique of kyphoplasty or spondyloplasty by balloon began in France in 2004. Its principle is based on a stabilization in two stages of the intervertebral body under radioscopic control: a phase of expansion by the inflation of two balloons, followed by an injection of low-pressure cement. The restoration of the vertebral height exercised by balloons would have an additive antalgic effect on that of a simple vertebroplasty. The clinical objective is an improvement of the prognosis for survival and function, hence of the quality of life [2]. In terms of evaluation, the Committee of Evaluation of Professional Acts judged the service expected from the act of kyphoplasty as indefinite [3]. To date, there is no specific act on the French classification of the medical acts (FCMA). The only act that appears neither classifies nor mentions the system of expansion by balloons: LHMH002: "unique Spondyloplasty, by transcutaneous way with radiological guide". In parallel, the Committee of Evaluation of Products and Performances judged the service expected from some bone cements as insufficient.

The only implantable device used during the kyphoplasty is not registered on the French List of Products and Refundable Services (LPPR). This registration is essentially based on the main diagnosis, the comorbidity, and the associated acts. It varies according to three big indications of the kyphoplasty, which are the osteoporotic fractures, the osteolytic damage due to a myeloma or to skeletal metastases, and the traumatic fractures. This technique is organized since January 2005 within our center in the services of neurosurgery and radiology. Since the medical devices (MD) used have a high cost without economic evaluation reported in the literature, it seemed justifiable to realize a current situation involving this technique in our center. The main objective of the study is to compare the spending committed by kyphoplasty, estimated according to three methods of valuation, with the recipes perceived by the hospital in conformity with the homogeneous groups of stay (HGS). Does the current HGS correctly evaluate the kyphoplasty? Are there factors influencing the valuation such as the realization of a peroperative biopsy, the age, or the initial indication of the kyphoplasty?

Materials and methods

We conducted a multidisciplinary monocentric retrospective study in our university regional hospital (CHRU). It includes all the patients having benefited from a kyphoplasty for osteoporotic, malignant, or traumatic VCF between January 1st, 2008 and December 31st, 2010 in the departments of neurosurgery and radiology. Patients were identified by means of the data of legal traceability of bone cement and related DM used for techniques reported within the framework of the innovation.

Clinical and therapeutic data

The clinical and therapeutic data arise from patients' medical reports. The indications of the kyphoplasty and the complications were validated by the neurosurgeons after a review of the medical records and the radiographies. The biopsies realized in the decrement of the surgery were extracted from the histopathologic reports to guarantee the exhaustiveness of the collection. The department of medical information (DMI) supplied the data related to every hospital stay.

Economic analysis

The considered point of view is the one of the French payer, that is, the healthcare insurance (medicare). The analysis took into account the direct medical costs. The spending related to the hospitalization as well as the sterile cost of the DM used were collected, quantified, and then valued. The cost related to analgesic drugs was not valued in the analysis, because it was unimportant with regard to the costs both in DM and in hospitalization. The duration limited itself to the stay of hospitalization, including the act of kyphoplasty. Data mining in the traceability base enabled us to obtain an exhaustive sterile collection of the DM necessary for the technique (balloons, working cannulas, curettes, devices for injection, bone cements, and devices for biopsy). The valuation is realized from the unitarian purchase prices (inclusive of all taxes) for the year 2010.

The duration of hospitalization includes the incomplete days of hospitalization. The MID gave the duration of hospitalization, and the GHM attributed it to the stay of every patient. The coding reference used is the V11b version of the classification of the GHM; for the stays coded with a previous version, a