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Original article

Cost-effectiveness assessment in outpatient sinonasal surgery

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ARTICLE INFO

Keywords:
Outpatient surgery
Medical cost
Sinonasal surgery
Health economics

ABSTRACT

Aims: To assess the cost-effectiveness of outpatient sinonasal surgery in terms of clinical efficacy and control of expenses.

Methods: A retrospective study was conducted from January 2014 to January 2016. Patients scheduled for outpatient sinonasal surgery were systematically included. Clinical data were extracted from surgical and anesthesiology computer files. The cost accounting methods applied in our institution were used to evaluate logistic and technical costs. The standardized hospital fees rating system based on hospital stay and severity in diagnosis-related groups (*Groupes homogènes de séjours*: GHS) was used to estimate institutional revenue.

Results: Over 2 years, 927 outpatient surgical procedures were performed. The crossover rate to conventional hospital admission was 2.9%. In a day-1 telephone interview, 85% of patients were very satisfied with the procedure. All outpatient cases showed significantly lower costs than estimated for conventional management with overnight admission, while hospital revenue did not differ between the two.

Conclusion: This study confirmed the efficacy of outpatient surgery in this indication. Lower costs could allow savings for the health system by readjusting the rating for the procedure. More precise assessment of cost-effectiveness will require more fine-grained studies based on micro costing at hospital level and assessment of impact on conventional surgical activity and post-discharge community care.

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1. Introduction

Outpatient surgery is an alternative to conventional hospital admission, intended to reduce waiting time and nosocomial infection rates. It further reduces the impact on personal and occupational activity, enabling faster social rehabilitation [1]. The French health system used to be behind English-speaking countries for this type of hospitalization, but has progressively integrated the outpatient approach. A 2014 joint report by the General Finance Inspectorate (*Inspection générale des finances*: IGF) and General Social Affairs Inspectorate (*Inspection générale des affaires sociales*: IGAS) estimated that outpatient surgery rates rose from 32% to 43% between 2007 and 2013 in France: i.e., a mean rise of 1.7% per year [2].

Material and technical progress in sinonasal and septal surgery now allow minimally invasive treatment in many indications [3,4].

In 2015, the French Society of ORL published guidelines for the development of outpatient surgery in rhinology, stressing the need for strict patient selection [5]. Unanticipated admission is presently the main criterion of failure of outpatient management [6,7]. Although not necessarily bound to patient satisfaction, ambulatory surgery meets the objective of health-economic efficacy in terms of reducing costs and hospital stay while ensuring the quality of care. The 2014 General Finance Inspectorate report determined the possible national-level cost savings with outpatient surgery in terms of payment for hospital stays according to duration and severity [2].

To date, no studies have assessed the health-economic impact of outpatient surgery at hospital level for a specific activity. The objectives of the present study were:

- to assess the medical quality of outpatient surgery for rhinologic diseases in our center by analyzing the rate of crossover to conventional admission and measuring patient satisfaction;
- to estimate the economic benefit of outpatient surgery by comparing costs between outpatient and conventional management.

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2. Materials and methods

2.1. Population

A retrospective analysis covered the period January 1st, 2014 to January 1st, 2016, including all patients managed on an outpatient basis for sinonasal pathology in our ENT and Head and Neck Surgery department. Surgery was considered to be on an outpatient basis if conducted under general anesthesia with same-day discharge home. Patients were selected by the surgeon and anesthesiologist according to comorbidity, living conditions and the level of understanding of the patient and family. All patients had ASA (American Society of Anesthesiologists) scores of 1 or 2; patients with ASA score ≥ 3 were not eligible for outpatient surgery.

Data were collected anonymously on a Microsoft Excel™ file. The confidentiality conditions were approved by the national data protection commission (*Commission nationale de l'informatique et des libertés*: CNIL). Exhaustiveness and coherence were ensured by crossing data from the medical outpatient file, computerized anesthesiology file (DIANE) and the medical information systems program (*Programme de médicalisation des systèmes d'information*: PMSI) of the Medical Information Department. Data comprised age, gender, history, smoking status and home-to-hospital distance.

2.2. Surgical procedures

All patients were operated on under general anesthesia in a dedicated outpatient structure next to the conventional admission department. Scheduling ensured that all procedures were completed by 3pm at the latest, with at least 4 hours' postoperative surveillance in the recovery room then in the outpatients section. Procedures were classified according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD) system, in 4 categories: rhinoplasty, including all plastic reconstructions of the nasal pyramid, possibly associated to septal surgery; reduction of nasal bone fracture by direct or closed approach; septoplasty and/or turbiniplasty; and sinonasal surgery, systematically endoscopic but associated in some cases to a vestibular approach for dental treatment. Discharge home was authorized after checking clinical and anesthesiological recovery criteria, based on cardio-respiratory normalization, absence of active bleeding, and control of pain and nausea/vomiting [8]. An accompanying person for the return home and following night was mandatory.

2.3. Postoperative follow-up

The circumstances underlying crossover from outpatient to conventional admission were specified. Satisfaction with discharge home was self-assessed on a visual analog scale (0 = not at all satisfied; 10 = very satisfied) and postoperative complications were collected on telephone contact by a paramedical coordinator on day 1.

2.4. Patient management cost estimation

Total patient management costs comprised stay-related and treatment-related costs.

Stay-related costs were estimated following the 2014 Hospital Analytic Accounts system (*Comptabilité analytique hospitalière*: CAH): medical logistics costs (pharmacy, sterilization, hygiene and biomedical engineering), medico-technical costs (anesthesia, imaging, biology, physiotherapy, nutrition), general overheads (human resources, cleaning, energy, IT, meals, stretchers, laundry) and structural overheads (building amortization and upkeep). These items were estimated for the outpatient unit and conventional admission to the ENT and head and neck surgery

department following the Analytic Results Account system (*Compte de résultat analytique*: CREA), using the model developed in the National Common Methodology Costs Study (*Étude nationale des coûts à méthodologie commune*: ENCC), taking account of adjustable, fixed and variable costs of Missions of General Interest and Contractualization Aid (*Missions d'intérêt général et d'aide à la contractualisation*: MIGAC) and income from Teaching, Research, Reference-center care and Innovation Missions (*Missions d'enseignement, de recherche, de référence et d'innovation*: MERRI). This gave estimates of €458.40 per day for the outpatient unit and €680.30 per day for conventional admission.

Treatment-related costs were also based on the 2014 Hospital Analytic Accounts system. A total cost per item of the Common Medical Acts Classification (*Classification commune des actes médicaux*: CCAM) relevant to outpatient sinonasal surgery was estimated in terms of Relative Costs Indices (*Indices de coûts relatifs*: ICR), as the sum of the surgical, anesthesiological and anatomopathological components (€3.44, €3.23, and €0.13 per ICR, respectively), each multiplied by the number of ICR points attributed to the procedure in question.

To assess the economic benefit of outpatient management, the cost of treatment with an added overnight stay was simulated for all outpatients. Adding an overnight stay did not affect treatment-related costs. The extra stay-related costs were estimated from the 2014 Hospital Analytic Accounts system for the conventional ENT department unit. The benefit of adopting outpatient management was calculated as the difference between the simulated overnight admission costs and the actual outpatient management costs. Patients scheduled for outpatient treatment but requiring crossover were included in the economic impact calculation as cases of conventional admission.

2.5. Estimation of hospital income related to treatment

Hospital income consisted of the stay-related group (*Groupes homogènes de séjours*: GHS) rating for each disease-related group (versions v11e, v11f and v11g), adjusted for any floor, ceiling or set price and supplementary daily fees. To improve income estimation, coherence control was performed for the study period by checking the diagnoses and medical acts as coded in the Medical Unit Summaries (*Résumés d'unité médicale*: RUM) in each Standardized Discharge Summary (*Résumé de sortie standardisé*: RSS). Like for costs, the impact on income of adopting outpatient management was assessed as the difference in income for outpatient treatment prolonged by overnight stay and actual income for outpatient treatment.

Finally, the total theoretic economic impact of adopting outpatient management was estimated by subtracting income differential from the cost differential.

2.6. Statistics

All the anonymous data on the Microsoft Excel™ file were analyzed on SPSS™ v 22.0 statistical software (SPSS Inc., Chicago, IL). Numerical variables were reported as means with standard deviation. The parametric Student test for matched groups was used to compare mean costs and income between actual outpatient management and simulated overnight stay. The significance threshold was set at $P \leq 0.05$.

3. Results

3.1. Population

Over the 2-year study period, 1999 rhinologic surgical procedures were performed: 1732 under general anesthesia, including

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