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Original article

# Day-surgery in otology: Impact study of a dedicated organizational model

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## ARTICLE INFO

**Keywords:**  
 Day surgery  
 Otology  
 Ossiculoplasty  
 Otosclerosis  
 Scheduling

## ABSTRACT

**Aim:** Day surgery (DS) in otology in France is insufficiently implemented compared to other countries of comparable socio-economic level. The aim of the present study was to evaluate changes in surgical practice in “major otology” cases in a hospital center after launching a dedicated ENT DS unit.

**Material and methods:** This new unit, designed in collaboration with the surgeons, was inaugurated in 2014. Number of procedures, patient demographics, surgery durations, and rates of crossover from DS to conventional management were recorded prospectively for the year before and the year after the launch. All otologic surgery procedures with at least tympanomeatal flap elevation were included; minor surgeries such as grommet insertion were excluded.

**Results:** Between the two time periods, major otology day cases increased from 106 to 153 procedures (+43%). In 2013, the DS rate was 27%, versus 56% in 2015. Otosclerosis surgeries represented 7% in 2013 and 15% in 2015, and type II and III tympanoplasties 3% and 24% respectively. Difference in patient age between DS and conventional surgery was lower in 2015. Crossover rates were 10% in 2013 and 21% in 2015, mainly due to nausea/vertigo (56%) and surgery ending too late in the day (33%).

**Conclusion:** Major otologic cases are suitable for DS. Launching this dedicated unit with its specific organization enabled a very significant increase in DS rates, probably due to greater patient satisfaction and surgeons' growing confidence. The main pitfall was in scheduling, with surgery ending too late in the day for discharge home; this has since been corrected.

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## 1. Introduction

Performing surgery on an outpatient basis (day surgery: DS) has been strongly encouraged by the French health authorities for some 5 years now, notably for economic reasons. According to the Audit Office, cost savings of €5 bn could be achieved if 50% of surgical procedures in France were performed as DS ([www.has-sante.fr](http://www.has-sante.fr): 2012 summary report on day surgery). France is lagging badly behind other European countries and countries of comparable socio-economic level, such as the UK, where 10 years' experience was already reported in 2006 [1]. The main obstacle is generally agreed to be an unwillingness to change habits, for fear of complications ([www.has-sante.fr](http://www.has-sante.fr): 2012 summary report on day surgery). Setting up a dedicated organizational model (see below) to improve quality of management and patient satisfaction while maintaining good levels of safety is the key to changing surgeons' practices.

It is now well established that DS is associated with a high level of satisfaction on the part of patients, who can return home on the actual day of surgery [2,3]. This shorter hospital stay, however, must not be to the detriment of patient safety (bleeding or infection) or comfort (identical management of pain, stress and nausea and vomiting). DS is therefore regulated, under a specific form of organization to optimize the care pathway and reduce risks, which must not be greater than those of conventional surgery (CS) [4]. “Day” surgery is defined as less than 12 hours' hospital stay; the structure concerned is responsible for ensuring continuity (with a surgeon and anesthetist on call) or else to have an arrangement with another structure able to admit and manage the patient in case of complications. If postoperative course is simple, before discharge the patient receives a detailed surgical report, preferably included in a referral letter indicating usual treatments, specific postoperative treatments, transfusion if any, and contact details. He or she also receives a discharge report, signed by a physician, detailing the procedure to be adopted in case of complications. A prescription is made out, including prevention of nausea and vomiting.

A specific environment is required for DS, 4 types of structure being possible:

DOI of original article: <https://doi.org/10.1016/j.aforl.2018.11.011>.

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- a structure integrated in a conventional unit, with reception and stay spaces dedicated to DS, but a shared operating room;
- an autonomous structure with dedicated reception and stay spaces and operating room, with the latter situated within the CS operating area;
- a satellite structure with all facilities independent of the CS structures, but within the hospital center in which lodging can be provided;
- a completely independent structure, outside of any CS establishment.

Operating rooms for DS are regulated, and must meet the same standards as in conventional management. Recovery-room transfer is mandatory, except in certain cases which are not relevant to otologic surgery: cataract surgery, strictly cutaneous surgery, etc. Telephone contact on day 1 by a qualified member of staff to check for any complications the patient may have overlooked is recommended but not mandatory.

Patient selection is a key to success in DS. Candidates must meet strict medical and surgical criteria, not detailed here but including ASA (American Society of Anesthesiologists) class I or II and age >6 months, and certain psychosocial and environmental criteria. The patient must have understood and agreed to the DS procedure: i.e., must have an adequate level of understanding; in the case of minors, patients with cognitive impairment or not speaking French, this understanding and agreement concerns the accompanying person. Time and distance to return home are not exclusion criteria but each case should be assessed in light of the specific surgical risks and, if the distance home is too great, there needs to be an arrangement with a nearby relay structure. Home accessibility and equipment, including telephone access, are also to be taken into account.

ENT surgery [5,6], and otologic surgery in particular [7], are especially well suited for DS. Classically, the distinction is made between minor surgery such as grommet fitting or myringoplasty without tympanomeatal flap elevation and major surgery such as tympanoplasty with mastoidectomy or ossicle surgery.

The aim of the present study was to assess changes in practice with the creation of a dedicated DS unit in a hospital in which admission was previously predominantly conventional. The DS structure was of type (i) (above): integrated in a CS unit, with dedicated reception and stay areas, but shared operating room. We report our experience in “major” otologic surgery.

## 2. Material and methods

The center studied here had predominantly used conventional admission, with no specific premises or circuit for DS: patients stayed in the CS ward. Work was carried out to change the structure and organization in depth, creating a type (i) dedicated structure: with dedicated reception and stay areas, but shared operating room. This DS unit was opened in 2014. Data were collected prospectively on number of conventional and day admissions between 2013 and 2016 and on patient demographics, operative time according to procedure, and crossover to CS. “Major” otologic procedures, at least including tympanomeatal flap elevation, were included. Myringotomy (paracentesis) and grommet fitting were excluded, as was myringoplasty without tympanomeatal flap elevation (fat plug or butterfly cartilage).

The transitional period was in 2014, and data for this year were excluded. Comparisons were thus between the calendar years 2013 (predominantly CS) and 2015 (with dedicated DS structure).

Procedures were categorized by increasing risk of complications such as dizziness and vomiting, ossicle surgery and varying operative time:

- type I tympanoplasty (TI) without ossicle surgery;
- type II or III tympanoplasty (TII/III) with ossicle surgery;
- tympanoplasty with mastoid-attic exploration or mastoidectomy with drilling (Tmasto + );
- canal wall up cholesteatoma surgery (CWU-Chol);
- canal wall down cholesteatoma surgery (CWD-Chol);
- otosclerosis surgery of whatever type: stapedectomy, stapedotomy, laser (Otoscl).

There were 7 surgeons, all senior otologists.

Results were reported as percentages, or as absolute values in Fig. 1. Mean demographic values and operative times were compared on Student t test, with a significance threshold at  $P < 0.05$ .

## 3. Results

One hundred and six major procedures met the inclusion criteria in 2013, and 153 in 2015. Exclusion rates (non-major surgery) were the same for the 2 periods, at around 18%. The number of patients undergoing major otologic surgery with conventional admission or DS increased by 43% between 2013 and 2015.

In 2013, 29 patients underwent DS and 77 CS: i.e., 27% DS. In 2015, the numbers were 86 and 67 respectively: i.e., 56% DS.

Fig. 1 presents the activity in CS and DS according to type of surgery in 2013 and in 2015. In 2013, CS predominated, and included 44% CWU cholesteatoma surgery and 27% otosclerosis surgery. Only one TII/III procedure was performed as DS. Mastoidectomy was not considered an exclusion criterion for DS. DS included 35% TI and 45% cholesteatoma. In 2015, more than half the procedures were performed as DS; otosclerosis was evenly distributed between CS and DS; there was a sharp increase in DS for TI and TII/III: 2.6-fold more than in CS.

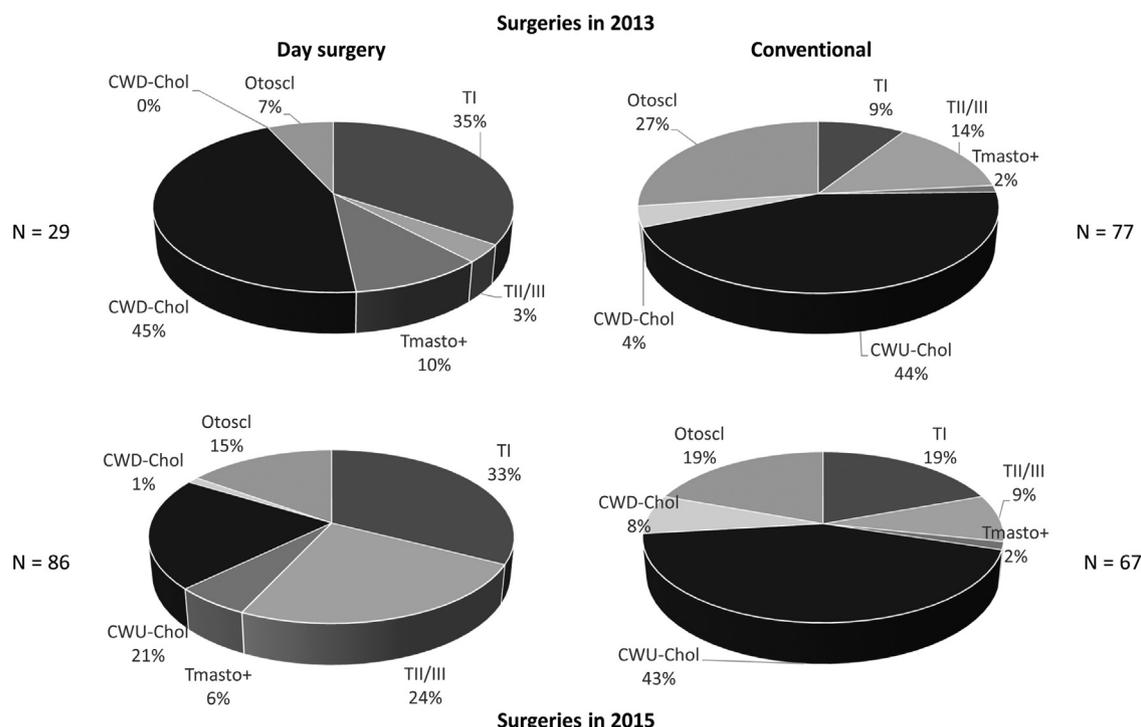
Table 1 shows demographics for the 2 years. In 2013, 11 under-15 year-olds were managed by DS and 3 by CS. In 2015, the numbers were 12 and 3, respectively. On average, patients (taking all age-groups together) were significantly younger in DS in both years, but with a greater age difference between DS and CS in 2015.

Table 2 shows operating time, which was significantly longer in CS, in both years.

The rates of crossover to CS were 10% in 2013 and 21% in 2015. Reasons were mainly nausea/vomiting/dizziness (56% of cases) and concerned otosclerosis surgery in 60% of cases. Other causes comprised poor scheduling with late exit from theater (33%) and pain or bleeding (11%).

## 4. Discussion

The institution had a strong policy of change in admission practices. As of 2015, DS was fairly widely offered to patients meeting the eligibility criteria described in the present Introduction. The medical and paramedical staff adhered to the project, thanks to the restructuring involved in setting up a type (i) structure with dedicated reception and stay and shared theater, based on the American “swing system”. Pediatric and adult admissions are physically separated, with the children’s premises equipped with toys, screens showing cartoons and a wall-panel for drawing on. The CS ward shrank from 11 to 6 beds, providing a fallback solution in case of crossover. There are 24 places in DS. The DS premises are completely open-plan, like a second recovery room, with opaque screens for privacy. Patients are thus always under surveillance by the care staff, improving care and enhancing the confidence of both patients and staff. On arrival, the patient is received by a member of the paramedical team, puts personal items in a code-secured locker, and is settled in a post comprising an electrically operated chair (Stryker®) with wall suction and oxygen supply. The patient



**Fig. 1.** Proportions of types of "major" otologic surgery in 2013 and 2015 in day surgery and conventional surgery. TI: Type I tympanoplasty without ossicle surgery; TII/III: Type II or III tympanoplasty with ossicle surgery; Tmasto+: Tympanoplasty with mastoid-attic exploration or mastoidectomy with drilling; CWU-Chol: Canal wall up cholesteatoma surgery; CWD-Chol: Canal wall down cholesteatoma surgery; Otoscl: Otosclerosis surgery.

is then accompanied on foot to the operating room. Back in the recovery room, he or she is settled in a different post, depending on the type of anesthesia (short, medium or long). This optimizes post occupancy and personnel resources. No premedication is used, to avoid lengthy recovery.

With this new organizational model, DS rates rose from less than a third to one half between 2013 and 2015. The rate of "minor" surgeries was unchanged, at less than 20%. DS has long been standard practice in surgery not involving tympanomeatal flap elevation [6], but few French centers have reported their experience with DS for major surgery liable to be associated with vertigo, greater blood loss and longer operative time. In 2014, Uziel reported a 30% rate of DS in France [4], without detailing whether this concerned only major otologic surgery. In our own practice, the number of conventional admissions was stable, falling only from 77 to 67, while the increase in activity concerned DS. Reading Figure 1 horizontally shows a high rate of CWU cholesteatoma procedures in both CS and DS in 2013 (45%); procedures liable to induce dizziness by labyrinth opening (otosclerosis surgery) or potentially unstable columella effect (type II or III tympanoplasty), on the other hand, were seldom performed as DS. In 2015, the rate of CWU cholesteatoma procedures in DS was half that of CS (21% versus 43%), while the absolute values showed no change. In 2013, there were 13 CWU procedures in DS and 34 in CS, and, in 2015, 18 and 29 respectively. Progression thus concerned DS, in favor of otosclerosis surgery and tympanoplasty. Reading Figure 1 vertically reveals a decrease in otosclerosis and TII/III in CS between 2013 and 2015, while they showed almost the same proportions as other surgeries in DS in 2015 (DS: CWU-Chol, 21%; TI, 33%; TII/III, 24%; otosclerosis, 15%).

In 2013, DS patients were significantly younger, by 18 years on average (31 versus 49 years;  $P=0.001$ ; Table 1). In 2015, mean age in DS had risen significantly by 10 years (mean, 41 years;  $P=0.04$ ), with no change in CS. The difference between the two remained significant in 2015 ( $P=0.04$ ) but was reduced to 7 years. Age profiles were unchanged between 2013 and 2015 in CS, while mean age in

**Table 1**  
Patient age in DS and CS according to year.

Age (years)	Day surgery	Conventional	significance
2013	31.4 ± 22	49.2 ± 24	$P=0.001$
2015	41.5 ± 20	48.6 ± 20	$P=0.05$
	$P=0.04$	ns	

ns: non-significant.

**Table 2**  
Operative time according to day surgery or conventional surgery and to year.

Time (h.min)	Day surgery	Conventional	Significance
2013	1.25 ± 34	1.43 ± 46	$P=0.03$
2015	1.26 ± 38	2.07 ± 60	$P=0.0001$
	ns	$P=0.02$	

ns: non-significant.

DS was greater in 2015 than in 2013. Operative time (Table 2) likewise showed a change in practices: in 2013, there was a significant difference ( $P=0.03$ ), but only of 22 minutes; in 2015, the difference was greater, at 40 minutes ( $P=0.0001$ ), with longer procedures ( $\geq 2$  hours) in CS, as confirmed by comparing operative time in CS between 2103 and 2015, with a mean increase of 24 minutes ( $P=0.02$ ).

Crossover rates, already high in 2013, were unsatisfactory in 2015 (10% and 21%, respectively). The literature reports rates of 3% and 25% for type I tympanoplasty and surgery involving mastoidectomy, respectively [1,7–9]. The high rate in 2015 was due to excessive enthusiasm for an "all-DS" attitude, adopted too systematically. Error was caused by poor medical planning, with underestimation of surgery time, and poor administrative scheduling, with long procedures beginning later than 3pm. These bad practices accounted for 33% of crossovers. More than half of the other cases (56%) concerned nausea, vomiting and dizziness, in otosclerosis surgery in 60% of cases. These figures are in agreement

with the literature [10]. Analyzing the data led us to review and improve our practices, and the planning meeting now anticipates such errors. In 2016, the crossover rate was down to 1% despite continued progression in DS (60% in 2016 and 65% in 2017) thanks to the conversion of certain surgeons who had at first been hesitant to implement DS.

## 5. Conclusion

Otologic surgery, even “major”, is entirely feasible in DS, with good patient satisfaction [2], [11], founded on teams that are experienced at every level: surgical, anesthesiological and paramedical. Changing the care structure by setting up a dedicated specific organizational model very significantly increased DS rates, thanks to surgeons' greater confidence in this type of management, which came to be proposed more frequently.

We were able to meet the French national target of 50% DS, even with procedures considered to be heavy in their peri-operative management. Conventional admission is now proposed for procedures in which operative time is expected to exceed 2 hours (large cholesteatoma), and when the patient lives far away, is isolated and/or presents multiple pathologies. Patients managed conventionally tend to be older ( $\geq 50$  years). Procedures liable to induce vertigo (otosclerosis surgery) do not contraindicate DS, but are associated with higher crossover rates.

Better preoperative planning and scheduling since 2016 has enabled progress in our practice of DS, in which there was room for improvement.

Our structure receives medical students, and the use of day surgery has not hampered our training of our young colleagues.

## Disclosure of interest

The authors declare that they have no competing interest.

## References

- [1] Qureshi AA, Padgham ND, Jiang D. Day-case major ear surgery: is it viable? *J Laryngol Otol* 2006;120(1):5–9.
- [2] Lemos P, Pinto A, Morais G, et al. Patient satisfaction following day surgery. *J Clin Anesth* 2009;21(3):200–5.
- [3] Tysome JR, Padgham ND. A comparative study of patient satisfaction with day case and in-patient major ear surgery. *J Laryngol Otol* 2006;120(8):670–5.
- [4] Uziel A. Day-case otological surgery. *Eur Ann Otorhinolaryngol Head Neck Dis* 2017;134(4):249–51.
- [5] Bhattacharyya N. Ambulatory sinus and nasal surgery in the United States: demographics and perioperative outcomes. *Laryngoscope* 2010;120(3):635–8.
- [6] Bhattacharyya N. Ambulatory pediatric otolaryngologic procedures in the United States: characteristics and perioperative safety. *Laryngoscope* 2010;120(4):821–5.
- [7] O'Neill JP, Young O, Conlon B. Major otology day case surgery: viable, cost efficient and safe. *J Med Sci* 2011;180(4):841–4.
- [8] Karkanevatos A, De S, Srinivasan VR, Roland NJ, Lesser THJ. Day-case myringoplasty: five years' experience. *J Laryngol Otol* 2003;117(10):763–5.
- [9] Rowlands RG, Harris R, Hern JD, Knight JR. Day-case paediatric mastoid surgery. *Int J Pediatr Otorhinolaryngol* 2003;67(7):771–5.
- [10] Jelacic T, Savage JR, Aron M. Is hospitalization necessary after ear surgery? A national survey and retrospective review of postoperative events. *Otolaryngol Head Neck Surg* 2017;157(4):707–15.
- [11] Oker N, Dupuch V, Herman P, et al. Outcomes of endoscopic ethmoidectomy performed on a day-case basis: a prospective bi-centric study. *Eur Arch Oto-Rhino-Laryngology* 2017;274(1):305–10.