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Day-case adenoidectomy – safety and cost effectiveness

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In order to evaluate the safety, economics and cost effectiveness of performing adenoidectomy as a day-case surgical procedure, collected data from theatre register, medical and nursing case notes were analysed with the safety results and costings were detailed of day-care cases in relation to inpatient results. Over the 2 yr period between October 1991 and September 1993 out of 2229 ear, nose and throat (ENT) procedures, 993 were day cases under the care of one consultant surgeon where the procedures were carried out by senior house officers, staff grade, clinical assistant and the consultant. Of these, 332 intended day-case adenoidectomies were performed either as part of multiple day-case procedures, 310 cases; or adenoidectomy alone, 22 cases. The age range was 2–15 yr. A morbidity rate of 16.57% (55 cases) requiring overnight stay was recorded, mainly due to clinical or social reasons. No cases of bleeding requiring return to theatre and no mortalities were reported. The calculated cost of treating the 332 patients on an intended day-care basis, less 55 cases kept overnight, has shown that a saving of over £27 500 per annum over the cost of inpatient treatment is attainable by one surgical firm. It is concluded that performing adenoidectomy as a day-case compared with inpatient procedure is surgically and clinically safe with no mortality and minor morbidity and is also cost effective with an average saving of 43.6%.

Key words: Adenoidectomy, day-case, cost, safety

Introduction

Traditionally, over the decades adenoidectomy has been performed under general anaesthesia as part of multiple ear, nose and throat (ENT) procedures, in the majority of cases as adenotonsillectomy. In the latter half of this century it has been performed more in conjunction with myringotomy and/or grommet insertion or combined with examination under anaesthetic of the upper respiratory tract mainly in children, although in a relatively small number of cases adenoidectomy is performed as a lone procedure. This has always made it a reason for considering adenoidectomy as a procedure that justifies overnight admission.

Over the past few years there has been repeated encouragement by the Audit Commission[1], King's Fund Centre for Health Service Development (personal communication) and NHS Management Executive[2] by building units dedicated to day-case surgery. The Royal College of Surgeons of England[3] has also recommended performing more day-case surgery, both as part of a cost-cutting exercise and to reduce waiting lists, as confirmed in later reports by Ahmed et al.[4]. The reduction in the psychological impact of hospital stay, especially on young age groups and their families, has been reported[4], in addition to the proof that day-case surgery is associated with less morbidity, as previously reported by Prugh et al.[5], Capper and Randall[6] and Shott et al.[7].

Material and methods

The indications for adenoidectomy are well established, namely: nasal obstruction, mouth breathing, snoring, nasal intonation, recurrent upper respiratory tract infections and eustachian dysfunction leading to otitis media, glue ears and their sequelae. However cleft palate or suspected submucus cleft are considered local contraindications for the procedure.

The decision to undertake adenoidectomy on a day-case basis was seriously considered after discussion with consultant anaesthetists who are well experienced in paediatric ENT surgery and who had worked with the author and the day-care unit nursing team for many years. This was followed by explanation and advice to individual parents to obtain their agreement.

The following criteria were laid down:

1. Patients should fulfil and pass health assessments and operative records, after the parents complete

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with a nurse the relevant record sheet that applies to children and adult day-care patients.
2. All patients are assessed on admission by the senior house officer (SHO) and the anaesthetist using a special admission form and preoperative routine observation recorded by day-care nursing staff.
3. Patients are admitted at least 1 h before the start of the morning operating list.
4. Operating lists start at 8.30 a.m. when the staffing level is high as recommended by Capper and Randall[6].
5. Children and their parents are encouraged to attend in groups 'The Saturday Club', where they are escorted by the nursing staff on a tour of the hospital departments and ENT unit, where details of what they should expect to see and what happens on admission are explained in clear terms and they are also encouraged to ask any questions while taking refreshments.
6. Parents are advised to stay with their children and encouraged to accompany them to the anaesthetic room on the day of surgery.
7. All the adenoids are done at the start of the operating list under a general anaesthetic.
8. No premedication is given.
9. The postoperative period is planned to expect postoperative discharge between 4–6 h after leaving theatre provided:
   (a) the patient is apyrexial;
   (b) no signs of revealed or concealed bleeding guided by half hourly standard observation for a minimum of 2 h;
   (c) no social or home reasons to delay discharge;
   (d) no signs of nausea, vomiting, irritability or sleeplessness and the child generally looks well;
   (e) patient had a light meal and drink when ready to eat.

If the patient does not fulfil any of the above criteria before discharge, they will be transferred to the inpatient ward for overnight observation and treatment then discharged when all the above criteria are fulfilled, usually within the next 24 h.

The following anaesthetic regime is usually applied with minor variations according to the preference of the consultant anaesthetist in charge of the list and the basic technique is as follows:

1. Preoperative:
   (a) no premedication;
   (b) Emla cream (Astra Pharmaceuticals) applied to the backs of both hands at least 1 h before transfer to theatre.
2. The anaesthetic procedure is carried out in the following order:
   (a) intravenous cannula;
   (b) thiopentone sodium (May and Baker) 4 mg kg^{-1} body weight;
   (c) suxamethonium chloride (Antigen Pharmaceuticals) 1.5 mg kg^{-1} body weight;
   (d) endotracheal intubation using plain oral tube of appropriate size;
   (e) immediately following the end of the procedure and before transfer to the recovery room the following medication is administered:
      (i) morphine sulphate 0.1–0.2 mg kg^{-1} or fentanyl citrate (David Bull Laboratories) 1 μg kg^{-1}.
      (ii) rectal diclofenac sodium (Voltarol) (Geigy Laboratories) 12.5–25 mg, one dose.
3. Surgery is performed by curettage using a very sharp adenoid curette and haemostasis is achieved by nasopharyngeal packing for a few minutes.
4. Postoperative medication:
   Mild postoperative analgesia in the form of paracetamol elixir 5–10 ml.

Results

Clinical details

The procedure was carried out on 332 cases fulfilling the above criteria and one or all of the indications for adenoidectomy as the sole procedure or as part of multiple day-case ENT procedures.

Table 1 shows a breakdown of adenoidectomy cases in this report and all other day-case ENT procedures as part of the ENT surgical load carried out under the care of one consultant surgeon.

The sex distribution in Table 2 shows that more male children undergo adenoid surgery, over 57% compared with 43% females. Analysis of age distribution in Table 3 shows that 75% of day-case adenoidectomy was carried out on children between the ages of 2 and 6 yr. Segal et al.[8] obtained similar figures when analysing 337 similar cases where the majority, 73.21% (276 cases) were in the 1–5 yr age group.

Mortality and morbidity breakdown from Table 4 showed at one end of the scale that nausea and vomiting are the main morbidity factor delaying discharge of 9.64% of all day-case adenoidectomy. At the other end of the scale there was no single case of bleeding either

Table 1. Summary of adenoidectomy as part of day-case ENT workload (October 1991 – September 1993)

	Total no. ENT cases: 2229	
	No.	*%*
Total no. day cases	993	44.64
Day-case adenoidectomy	332	33.43 (day cases) 14.89 (all ENT cases)

Table 2. Distribution by sex of 332 day-case adenoidectomies

	No.	*%*
Males	191	57.53
Females	141	42.47

Table 3. Age distribution of 332 day-case adenoidectomies

	No.	%
2–6 yr	249	75
7–11 yr	63	18.98
12–15 yr	20	6.02

Table 4. Morbidity and mortality analysis of 55 cases transferred to inpatient stay

Reason for transfer	*No.*	*%*
Nausea and vomiting	32	9.64
Pyrexia	10	3.01
Sleepy or irritable	8	2.41
Social reasons	5	1.51
Return to theatre	0	0.0
Bleeding after 6 h	0	0.0
Mortality	0	0.0

requiring return to theatre or more than 6 h observation, or a single mortality. This was confirmed in similar reports[8–10].

Other reasons for the delay of discharge were pyrexia over 37.5° C, sleeplessness or irritability and social reasons (transport and telephone availability or hospital-to-home distance was more than 15 min travel by car) which, together, made up 6.91% of all day-case adenoidectomy.

On discharge parents are given verbal and written advice regarding postoperative home-care and how to contact the doctor on-call through the ward if they are concerned and they are also handed a copy of their GP discharge letter.

Cost analysis

According to this hospital's costing and marketing department, adenoidectomy performed as an inpatient procedure before October 1991 was considered to have an average length of stay of 1.7 days at a cost of £173 per day and a total cost to the purchaser of £461 inclusive of accommodation, dressings, drugs and paramedical services, but excluding theatre and material costs. However according to the same source a day-case adenoidectomy will cost £260, a saving of £201 or 43.6% over the inpatient cost, which is comparable with other official government reports in this country from Welsh Office Statistics[11].

The total charge to the purchaser for 332 inpatient adenoidectomies at a rate of £461 per case will be £153 052, compared with a total cost of £86 320, if carried out on day-case basis at a cost of £260 per case for the same number of cases. This represents a total saving of £66 732 over a 2-yr period or £33 366 p.a. for one consultant's team, for the cases presented in this report.

However as the actual number of cases treated on a day-care basis was reduced by 55 to 277 at a total cost of £72 020, compared with £127 697 if treated on an inpatient basis, this would make a saving of £55 677 in 2 yr or £27 838.50 p.a. per consultant team or just over £11m (£11 135 400) if the day-care procedure is undertaken by only 400 consultant teams out of over 510 consultant members of the British Association of Otolaryngologists (BAOL) in the UK.

Discussion

The move to day-case surgery will depend on the surgeons' attempts to audit the results available from their own surgical practices and feedback from their patients, families and family practitioners. Stott[12] reported how popular day-case surgery is with doctors, nurses and patients.

The list of examples of appropriate ENT operations suitable for day-case surgery suggested in the guidelines for day-case surgery, published by the Royal College of Surgeons of England[3] did not include adenoidectomy, neither did the Audit Commission's[1] 'basket' of 20 procedures contain adenoidectomy as suitable for day-case surgery.

However the author found that day-case surgery is acceptable to parents, nursing staff, anaesthetists and family practitioners, as also reported by Garraway et al.[13], and in the author's opinion the formal inclusion of adenoidectomy in these lists following similar reports[14,15] will only be a matter of time, especially as both the Department of Health and Royal Colleges are aiming for day-care surgery to reach 50% of the total number of surgical procedures in the UK in the next few years; a figure that will be reasonably achievable in ENT surgery.

As from late 1991 the author began performing adenoidectomy as a single procedure and also as part of multiple ENT day-case procedures that included myringotomy, grommets, suction clearance and antrum washout on a day-case basis, but not adenotonsillectomy.

Clinical safety

Adenoidectomy and also tonsillectomy are safe, provided the patient has no significant systemic disease, a favourable social situation, parents with positive attitudes and a minimum of 6 h postoperative observation as reported by Lee[16].

The appreciation of GPs was evident in this series as they noted obvious increased access to shorter waiting lists as a result of quicker turnover in the use of beds. This was confirmed by Garraway et al.[13], where it was found that 75% of GPs appreciated quicker service, as well as patients, carers and district nurses, who were all in favour of day-care surgery for selected groups of surgical conditions.

The psychological impact on the parents of having their children stay overnight in hospital, in addition to the behavioural problems caused by the hospitalization of children and parental separation, is well documented in children under the age of 4[5,17]. This has been greatly

reduced in this series by the facilities offered to parents and carers to accompany and spend time with their children and then escort them home on the same day, a service that has been well recognized and appreciated by the families.

Postoperative bleeding as a major complication has a very low incidence in a published report by Leighton et al.[18], showing a rate of 0.34% of primary haemorrhage in a series of 20 000 cases and it was noticed to be nonexistent 6 h postoperatively, which encouraged others[4,5,19], including the author, to undertake day-care adenoidectomy on a large scale.

With the anaesthetic regime adopted in this series the author had minimal postoperative problems and it was found that endotracheal general anaesthesia for short-stay operative procedures had no increased morbidity over other reports[20].

Shott et al.[7] did not include complications studies of adenoidectomy performed as the main procedure in their series of tonsillectomy and adenoidectomy, as it was considered to have fewer potential complications. However pyrexia and nausea and vomiting have regularly been confirmed as minor complications. Mortality has never been reported in any of the series[4,7,19] including this report. The data in this series has shown that day-case adenoidectomy is safe provided 4–6 h of postoperative observation is adhered to.

Some clinical and social implications were learned from this study, namely:

1. Patients living more than 30 min drive from the hospital, or who have no private transport should be advised to have their children's operation performed on an inpatient basis.
2. If telephone communication is not available at home, day-care surgery should not be advised.
3. When adenoidectomy is carried out as part of an adenotonsillectomy procedure a minimum of 24 h postoperative stay should be mandatory.

Cost factor

Concern over the rising cost of healthcare in North America, reported by Guida and Mattucci[14] and now in the UK, reported by Garraway et al.[13] and Stott[12], has created a trend towards outpatient surgery, especially with regard to frequently performed procedures such as adenoidectomy and adenotonsillectomy and other paediatric ENT procedures. Segal et al.[8], Shott et al.[7] and Helmus et al.[21] have shown that a saving of up to 50% can be made with day-case surgery compared with overnight admission.

The significant financial savings have been clearly shown by the NHS Management Executive[2]. It is also demonstrated in this report that savings of over £11m could be achieved annually if day-case adenoidectomy could be adopted by an average of 400 consultant teams nation-wide.

The 43.6% saving estimated to have been achieved in this report is comparable with the Welsh Office figures for Ysbyty Maeor Hospital in Wrexham achieved by the thoughtful use of available resources, as reported by Burn[22], where the cost of day-case paediatric procedures prior to 1990 was £53.21 compared with £93.44 for the overnight use of a paediatric bed in the same hospital, a saving of 43.5%. Similar figures were also reported by Sadler et al.[23], where in East Glamorgan Hospital the cost of an overnight stay was £73.16 compared with £41.61 for a day-case bed in the same hospital, a saving of 43.12%.

Conclusions

This article reviewed adenoidectomy cases performed under the care of one surgeon in the 2-yr period between October 1991 and September 1993 as a day-case procedure carried out by various grades of surgical staff.

The total number of ENT day cases (993), day-case adenoidectomy (332), their mortality, morbidity, number and reasons for transfer to inpatient stay (see Table 4) and the cost effectiveness of the operation compared with overnight stay is discussed. The criteria and preoperative preparation, operative and anaesthetic procedures, postoperative management and complications of such cases are illustrated. This report is meant not only to assess the cost-related savings which have been well documented in previous reports by Welsh Office Statistics[10] and Sadler et al.[23] but also to demonstrate the absence of mortality and the low morbidity rate attached to day-case adenoidectomy.

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References

1 The Audit Commission. *A short cut to better service. Day Surgery in England and Wales.* London: HMSO, 1990
2 NHS Management Executive Value for Money Unit. *Day Surgery: make it happen.* London: HMSO, 1991
3 The Royal College of Surgeons of England. Commission on the provision of surgical services. *Report of the Working Party on Guidelines for day case surgery.* London: RCSE, 1985, revised edn, March 1992
4 Ahmed K, McCormick MS, Baruah AK. Day-case adenoidectomy – is it safe? *Clin Otolaryngol* 1993; **18**: 406–9
5 Prugh DG, Staub EM, Sands HH, Kirshbaum RM, Leniham EA. A study of the emotional reactions of children and families to hospitalisation and illness. *Am J Orthopsychiatry* 1953; **23**: 70–6
6 Capper JWR, Randall C. Post operative haemorrhage in tonsillectomy and adenoidectomy in children. *J Laryngol Otol* 1984; **98**: 363–5
7 Shott SF, Myer CM, Cotton RT. Efficacy of tonsillectomy and adenoidectomy as an outpatient procedure: a preliminary report. *Int J Pediatr*

Otorhinolaryngol 1987; **13**: 157–63
8 Segal C, Berger G, Basker M, Marshak G. Adenotonsillectomies on a surgical day-clinic basis. *Laryngoscope* 1983; **93**: 1205–8
9 Chaing TM, Sukis AE, Ross DE. Tonsillectomy performed on an out-patient basis: report of 40,000 cases without a death. *Arch Otol* 1968; **88**: 307–10
10 Crysdale WS, Russel D. Complications of tonsillectomy and adenoidectomy in 9409 children observed overnight. *CMAJ* 1986; **135**: 1139–42
11 Welsh Office Statistics. HMSO: April 1990
12 Stott NCH. Day case surgery generates no increased workload for community based staff. True or false? *BMJ* 1992; **304**: 825–6
13 Garraway WM, Ruckley CV, Prescott RJ. GP response to day case surgery. *Practitioner* 1978; **221**: 22–5
14 Guida RA, Mattucci KF. Tonsillectomy and adenoidectomy: an inpatient or outpatient procedure? *Laryngoscope* 1990; **100**: 491–3
15 Kendrick D, Gibbin K. An audit of the complications of paediatric tonsillectomy, adenoidectomy and adenotonsillectomy. *Clin Otolaryngol* 1993; **18**: 115–17
16 Lee IN. Out-patient management of tonsillectomy and adenoidectomy procedures in children. *J Otolaryngol* 1985; **14**: 176–7
17 Vernon DT, Schulman JL, Foley JM. Changes in children's behaviour after hospitalisation, some dimensions of response and their correlates. *Am J Dis Child* 1966; **111**: 581–93
18 Leighton SEJ, Rowe-Jones JM, Knight JR, Moore-Gillon VL. Day case adenoidectomy. *Clin Otolaryngol* 1993; **18**: 215–19
19 Caliebe W. Die bahandlung von blutungen nach Tonsillektomie und Adenotomie. *HNO* 1968; **16**: 218–21
20 Jones SE, Smith BA. Anaesthesia for paediatric day-surgery. *J Pediat Surg* 1980; **15**: 31–3
21 Helmus C, Grin M, Westfall R. Same-day-stay adenotonsillectomy. *Laryngoscope* 1990; **100**: 593–5
22 Burn JM. Responsible use of resources: day surgery. *BMJ* 1983; **286**: 492–3
23 Sadler GP, Watkins G, Richards H, Foster ME. Day-case paediatric surgery: The only choice. *Ann R Coll Surg Engl* 1992; **74**: 130–3