ELSEVIER

Ambulatory Surgery 9 (2001) 87–89

Ambulatory Surgery

www.elsevier.com/locate/ambsur

Anaesthetic drug costs in a district general hospital day surgery unit

Mary Elizabeth Stocker *, Kerri Houghton

Department of Anaesthesia, Torbay Hospital (South Devon Healthcare Trust), Lawes Bridge, Torquay, Devon TQ2 7AA, UK

Received 29 November 2000; accepted 1 January 2001

Abstract

Propofol infusions for the induction and maintenance of anaesthesia are associated with many advantages. In some units their cost is thought to be prohibitive and limits their use. We have analysed the drug costs within a Day Surgery Unit over a 4-year period in order to quantify the cost of the increased use of these infusions. In our unit this has not resulted in increased anaesthetic drug costs. We therefore advocate the continued use and development of these techniques which have been shown to have many advantages both to patients and to the smooth and efficient running of theatre units.

Keywords: Drug costs; TIVA; Day surgery

1. Introduction

Recent advances within anaesthesia have included the introduction of newer anaesthetic agents and methods of delivery. In particular, the use of propofol infusions for the induction and maintenance of anaesthesia, and remifentanil infusions for intra-operative analgesia and reduction in propofol requirements. These agents are associated with a low incidence of nausea and vomiting [1–4] decreased antiemetic requirements, [2] rapid ability to alter depth of anaesthesia which is not linked to ventilation, rapid emergence and hence short recovery time [3,4] earlier discharge from day-area units and decreased admission rates [2] earlier return to work and hence decreased sick leave requirement with its associated cost [3,5]. However despite convincing arguments to the contrary [6–8] in many units the cost of these drugs is thought to be prohibitive and hence limits their use. Previous work has shown that the cost of anaesthetic drugs contributes $<4\%$ of the total cost of a day surgery procedure [6] and that there is little variability in drug costs between anaesthetists using total intravenous anaesthesia and those using volatile techniques [7]. When the costs of consumables and theatre staff are included, those patients receiving a cheaper anaesthetic when measured in terms of drug costs, in fact occurred a higher total cost [6]. The same author has also shown that the majority of anaesthetic drug cost occurs at induction and that it costs relatively little to maintain anaesthesia even when using propofol infusions [9].

We have analysed the drug costs within the Day Surgery Unit of a District General Hospital over a 4-year period during which the use of these drugs was increasing, in order to quantify the cost of this increase. The unit is self contained, treats no inpatients and is able to identify its own expenditure and workload.

2. Methods

A list of the top one hundred drugs (total cost) used in the unit within a 4-year time period (1996–2000) was obtained from the hospital pharmacy computer system. Any drugs not used by anaesthetists were excluded. The cost of each drug for each year being studied was recorded. Information about total numbers of cases performed in this time period, length of cases, how

* Corresponding author. Present address. Department of Anaesthesia, Royal Devon and Exeter Hospital, Barrack Road, Exeter EX2 5DW, UK. Tel.: +44-139-2411611.

E-mail address: mary@kellaway.demon.co.uk (M.E. Stocker).

0966-6532/01/$ - see front matter
PII: S0966-6532(01)00077-4

Table 1
Summary of drug costs during the period studied

	1996/97	1997/98	1998/99	1999/00
Total anaesthetic drug costs	£56 894	£64 654	£73 249	£74 652
GA cases	4492	4933	4916	4843
Anaesthetic drug costs/GA	£12.67	£13.11	£14.90	£15.41
TIVA (% of GA)	2587 (58%)	3063 (62%)	3022 (61%)	3232 (67%)
Hours/Case	0.47	0.47	0.48	0.52
Total hours GA	1805	1870.4	2092	2228.5
Anaesthetic drug costs/h GA	£31.52	£34.57	£35.02	£33.50

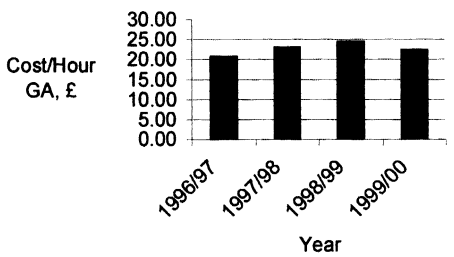

Fig. 1. Cost of anaesthetic agents per hour of general anaesthesia time.

many of these were under general anaesthesia and, of these, what percentage were anaesthetised using total intravenous anaesthesia was retrieved from the unit database. In addition, we were provided with data for total cost per case and hours of theatre activity for the unit for each year being studied. Drug costs per case and per hour of theatre time for general anaesthesia cases were then calculated.

3. Results

The results of our study are summarised in Table 1.

Within the time period studied total theatre activity in terms of cases performed increased by 22.7%. Cases performed using Total Intravenous Anaesthesia (TIVA) increased by 25%. This was associated with an increased cost of general anaesthetic drugs per general anaesthesia case, but this was only an increase of 17.8%. It will be noted that during this time period the time per case has increased. This is due to a change in case mix within the day surgery unit resulting in longer cases being performed. During this time the termination of pregnancy service was transferred elsewhere, resulting in the removal of these short procedures from our lists. They have been replaced by longer procedures. In common with other units, the scope of day surgery is being constantly extended resulting in longer and more complex procedures now being carried out in day surgery units. When account is taken of procedure time within our calculations, it can be seen that the cost of anaesthetic drugs when measured per hour of theatre time has actually reduced over this period.

More detailed analysis of drug costs showed that, as expected, the majority of the drug costs of anaesthesia are due to the cost of intravenous and volatile anaesthetic agents. However, the cost of this group of agents has increased only marginally. (Fig. 1).

When looking at the costs of other anaesthetic drugs over the period studied, Fig. 2, it can be seen that most have not varied greatly. The reduction in cost of muscle relaxants reflects both decreased cost and decreased use within our unit. The reduction in cost of anti-emetic medication, which is not used routinely, is partly due to switching brands of 5-HT_3 antagonists. Introduction of remifentanil in 1998/1999 was associated with a slight increase in opiate costs. The increase in cost of simple analgesic agents is mainly due to the use of diclofenac eye drops which occurred when we incorporated ophthalmic surgery into our unit.

4. Discussion

We have shown that the increasing use of agents often classed as expensive, has not resulted in increased

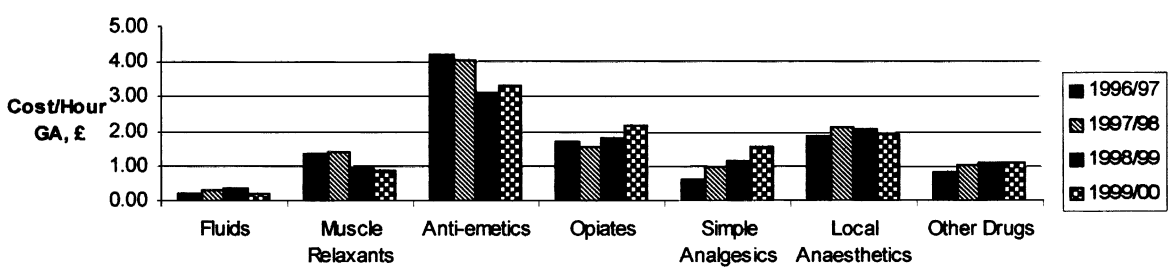

Fig. 2. Costs per hour of general anaesthesia of drugs used during anaesthesia.

anaesthetic drug costs when measured per hour of general anaesthesia. These drugs constitute a small percentage of the total cost of a day surgery procedure within our unit. It would therefore appear that the most effective way to reduce the actual cost per case would be to achieve more cases with the same overhead and staff costs. Using drugs, which aid faster, complication free recovery may contribute to an increased throughput of cases. Previous work has shown that use of TIVA is associated with decreased anaesthetic time and increased throughput of cases [6]. Other factors often not considered when discussing drug costs are the cost to the patient, their employer and the state if their return to work is delayed. It has been shown that patients return to work earlier following anaesthesia with propofol infusions [3]. Our work has shown that within our day surgery unit increased use of total intravenous anaesthesia is not associated with increased drug costs. We would therefore advocate the continued use and development of these techniques which have been shown to have many advantages both to the patients and to the smooth and efficient running of theatre units.

Acknowledgements

We are very grateful to Paul Humphriss, Pharmacy Economist at Torbay Hospital for providing details of prices and commenting on our findings.

References

[1] Sneyd JR, Carr A, Byrom WD, Bilski AJT. A meta-analysis of nausea and vomiting following maintenance of anaesthesia with propofol or inhalational agents. Eur J Anaesth 1998;15:433–45.
[2] Raftery S, Sherry E. Total intravenous anaesthesia with propofol and alfentanil protects against postoperative nausea and vomiting. Can J Anaesth 1992;39:37–40.
[3] Sung YF, Reiss N, Tillette T. The differential cost of anaesthesia and recovery with propofol-nitrous oxide anaesthesia versus thiopental sodium-isoflurane-nitrous oxide anaesthesia. J Clin Anaesthesiol 1991;3:391–4.
[4] Phillips AS, Mirakhur RK, Glen JB, Hunter SC. Total intravenous anaesthesia with propofol or inhalational anaesthesia with isoflurane for major abdominal surgery. Recovery characteristics and postoperative oxygenation — an international multi centre study. Anaesthesia 1996;51:1055–9.
[5] Enlund M, Kobosko P, Rhodin A. A cost-benefit evaluation of using propofol and alfentanil for a short gynecological procedure. Acta Anaesthesiol Scand 1996;40:416–20.
[6] Rowe WL. Economics and anaesthesia. Anaesthesia 1998;53:782–8.
[7] Rowe WL. The cost of anaesthesia; which drugs should we use in the future? R Coll Anaesthetists Newsletter 1999;44:8–9.
[8] Crozier TA, Kettler D. Cost effectiveness of general anaesthesia: inhalation vs. i.v. Br J Anaesth 1999;83:547–8.
[9] Rowe L, Kasnoswki Z. Anaesthetic costs in day surgery. The Journal of One-Day Surgery Winter 94/95, p. 7.