



Cost-minimisation analysis of endometrial thermal ablation in a day case or outpatient setting under different anaesthesia regimens

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ABSTRACT

Objective: To evaluate the cost difference between a daycase endometrial thermal ablation performed under general anaesthesia and an outpatient endometrial ablation using local anaesthetic.

Study design: Calculations using real reported resource use in 20 daycase procedures and 16 outpatient procedures.

Results: The costs were 1865 euros for daycase procedure versus 1065 euros for outpatient procedure.

Conclusion: The cost of endometrial thermal ablation can be considerably minimised by taking the procedure out of the theatre and performing it under local anaesthetic instead of general anaesthesia. This setting makes endometrial thermal ablation cost-effective.

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1. Introduction

Heavy menstrual bleeding occurs in 25% of women [1] and in addition to the health problem, it consumes substantial health service resources. Hysterectomy is the final surgical treatment but it is associated with significant morbidity and expense. The levonorgestrel-releasing intrauterine system (LNG-IUS) is usually the first-line treatment in Finland, and it has been proved to be effective in avoiding hysterectomy at least in a short one-year follow-up [2]. Some women, however, do not prefer it for personal reasons, and some women experience adverse effects, including progestogenic side effects, which cause discontinuation rates up to 50% at 5 years [3,4]. Eventually after 5 years up to 42% of the women treated with the LNG-IUS end up with a hysterectomy [5].

Second-generation endometrial ablation devices provide endometrial destruction techniques which do not require hysteroscopy. They seem to be as effective as the LNG-IUS in controlling heavy menstrual bleeding [6,7], and are less costly than hysterectomy even when performed after failed treatment with the LNG-IUS [8,9]. There seem to be only slight or no differences between most second-generation devices in efficacy or cost-effectiveness [10,11], but there is a trend towards bipolar radiofrequency ablation having better response rates than balloon ablation [12].

Endometrial ablation has traditionally been performed as a day case procedure under general anaesthesia. With modern devices,

which have shorter treatment times, it has become safe and well-accepted to perform the procedure under local anaesthesia [13–19]. The ability to perform endometrial thermal ablation using local anaesthesia raises the possibility of moving the procedure into the outpatient environment, and thus decreasing the amount and the cost of hospital resources used. An outpatient procedure is associated with more rapid discharge and the patient feels well straight after treatment, which are important factors to the majority of women [20–22].

When endometrial ablation is performed in an operating theatre, there are only minimal cost savings for the patient or health service from using local rather than general anaesthesia [23]. The aim of the present study was to evaluate the cost of a day case procedure performed under general anaesthesia in the operating theatre and an outpatient procedure performed using local anaesthesia. The selected economic evaluation method is cost-minimisation analysis, because the health outcomes of the compared alternatives are the same, and the cost-effective treatment option can be found by comparing the costs of the treatment alternatives.

2. Materials and methods

The treatment method evaluated was endometrial thermal ablation with Novasure[®] (Novacept, Palo Alto, California, USA). Novasure[®] is a bipolar radiofrequency electrode which is passed through the cervix into the uterine cavity, and radiofrequency energy is then delivered into the uterus via the electrode. The treatment requires cervical dilatation up to 8 mm, and the actual treatment usually lasts for approximately 90 s. For a day case procedure, the patients are admitted to the gynecology ward in the

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morning and treated in the operating theatre under general anaesthesia, and after the operation and observation in the recovery room they return to the ward, where they stay until fit for discharge. For an outpatient procedure, the patients arrive at the outpatient department, are treated in a dedicated outpatient operating theatre under paracervical block with ropivacaine (Naropin[®]) 2 mg/ml, total amount of 20 ml, and 0.5 mg intravenous alfentanil (Rapifen[®]) when necessary, and are discharged home after a few hours of postoperative recovery in the outpatient facilities.

Intervention cost was defined in terms of staff time spent on patient care, consumables (including drugs), resources used in relation to the operative procedure, and overhead costs. Cost items that were similar in both groups were excluded from the calculations, and thus the cost differences are the incremental differences between the two groups.

Data of each endometrial thermal ablation performed under general anaesthesia in the operating theatre during 2009–2010 ($n = 20$) were obtained from the hospital's operative database, which contains detailed information of every stage of the procedures, including time. Calculations of day case procedure costs were made by the local hospital financial planning department and they were based on real resource use on average, using 2009 cost information. The overhead costs were provided by the hospital financial planning department. Detailed assessment of outpatient procedure resource use was made by the nurses responsible for outpatient procedures performed during October 2010–May 2011 ($n = 16$). Staff cost was estimated based on local average salaries for consultant doctors and nurses. Pre-admission consultations and sick leaves were excluded as they were the same for both treatment methods. Also the effect of a companion (travel costs) was excluded for the same reason, because after having alfentanil, a companion is needed when the patient is leaving the hospital as well as after general anaesthesia.

We have calculated the costs from the health provider's point of view. Thus, for example, the time costs of the patients are not included in the analysis. It should be noted, however, that the time the patients spend in the hospital as a day case is longer (about 8 h) as compared to the time they spend in the outpatient procedure (about 4 h).

3. Results

The comparison of costs is shown in Table 1. Total costs for day case procedure were 1865 euros versus 1065 euros for outpatient procedure, so the cost difference was 800 euros.

A bipolar radiofrequency electrode was used in 5 of the 20 day case procedures, and the rest were performed with a balloon (ThermaChoice[®], Gynecare, Somerville, New Jersey), which has a treatment time of 8 min. The mean time from the beginning of the procedure to the end was 23 min with a balloon and 16 min with the bipolar radiofrequency electrode, so we reduced the times consumed by all staff in balloon procedures before making the final calculations for the study. All outpatient procedures were performed with a bipolar radiofrequency electrode.

In the operating theatre, three nurses (two operative nurses and one anaesthesia nurse) were needed, and the time for each nurse was calculated from the beginning of the preparations (of the theatre) until the patient was leaving the theatre (operative nurses) or until the patient arrived in the postoperative recovery room and a report was given (anaesthesia nurse). The time an anaesthesiologist was needed was calculated from the beginning of the anaesthesia until the patient arrived in the recovery room. The time that a gynecologist was needed was calculated from the beginning of the procedure to the end of the procedure.

In the outpatient procedure, the time that a gynecologist was needed was also calculated from the beginning of the procedure to

the end of procedure. Two nurses were needed during the procedure and one was needed for the preparations (30 min) and the recovery (60 min). Costs related to anaesthesia (including anaesthesiologist and equipment) were 279 euros for a daycase procedure versus 5 euros for an outpatient procedure.

A daycase procedure included a total amount of 353 euros of overheads costs (including rentals) versus 77 euros of overhead costs for an outpatient procedure. Overhead costs are common costs concerning the unit, which cannot be directed to a certain procedure. Overhead costs can be allocated to all procedures performed in the unit, and because the outpatient polyclinic has a greater number of visits than the operating theatre, overhead costs per procedure are less.

4. Comments

This study demonstrates that endometrial thermal ablation performed as an outpatient procedure under local anaesthesia instead of a daycase procedure under general anaesthesia results in significantly reduced health service costs. The outpatient procedure was 800 euros cheaper than the daycase procedure for the health service provider. The difference is caused by lower costs of the hospital ward and anaesthesia, and partly by overhead costs.

The outpatient procedure in the Finnish context is also cheaper for the patient. The day case price for patients is 83.90 euros versus an outpatient fee of 25.60 euros. This, however, cannot be used as an argument for the cost-effectiveness of the outpatient procedure, because the prices patients pay do not reflect the actual resource cost of the procedures.

The alternative treatment option for endometrial thermal ablation after unsuccessful LNG-IUS treatment for menorrhagia is hysterectomy. The mode of operation in these cases is usually laparoscopic hysterectomy, because these patients have an anatomically normal uterus and no other indications, like prolapse, for hysterectomy. Costs of performing endometrial thermal ablation in theatre under general anaesthesia approach the costs of laparoscopic hysterectomy, but the risks of complications are less and sick leave is shorter in endometrial ablation (two days) than in laparoscopic hysterectomy (2–3 weeks). The main reason a woman chooses endometrial ablation over hysterectomy is that she prefers a minimally invasive intervention with a short hospital stay [24]. Because endometrial ablation is a very safe procedure with practically no risk of severe complications, it is possible to take the procedure out of the operating theatre. Choosing paracervical block over general anaesthesia is related to high tolerability and high patient satisfaction and leads to a shorter hospital stay, and paracervical block also decreases postoperative pain due to uterine contractions. Paracervical block does not seem to increase the time spent in the procedure.

The limitation of this study is small number of cases, but endometrial thermal ablation with a second generation device is a highly repeatable procedure with a short learning curve, because it does not require hysteroscopy or great technical skills. The actual operating time is always the same, and it does not vary due to patient- or operator-related factors. The strength of this study is that it is based on real reported resource use, not a model.

Earlier it has been shown that the mode of anaesthesia does not affect the costs of endometrial ablation very much [23], but that is the case when the procedure is performed in a theatre setting. While it is known that endometrial thermal ablation is effective, with at least 85% of women avoiding hysterectomy, and performing the procedure under local anaesthesia is highly acceptable, the fact that taking the procedure out of the operating theatre significantly reduces the costs makes endometrial thermal ablation also cost-effective.

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