

Outpatient laparoscopic sterilization: is local anaesthesia better?

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A prospective, randomized study comprised 125 outpatient laparoscopic sterilization patients who had received either general anaesthesia or local anaesthesia together with intravenous sedation. The patients who had received local anaesthesia suffered significantly less postoperative pain and sore throat. Recovery and discharge were similar in the two groups, but those given a general anaesthetic were more drowsy in the evening on the day of operation. The time spent in the operating theatre was significantly shorter for the group given local anaesthesia, and the costs were lower. The majority of patients from both groups would prefer local anaesthesia for a similar procedure in the future. We conclude that local anaesthesia together with intravenous sedation is the method of choice for laparoscopic sterilization.

Key words: General anaesthesia, local anaesthesia, laparoscopy, sterilization, outpatient

During the last 20 years, voluntary sterilization has emerged as the most common method of family planning worldwide¹. In the future, reduced economic resources for non-vital health care may compromise sterilization services. We therefore face an increasing demand to supply this service with higher efficacy, shorter recovery time, and reduced costs. Safe and acceptable anaesthesia is mandatory. Most of the major complications of female sterilization result from general anaesthesia or from heavy sedation during local anaesthesia¹. New short-acting drugs have been introduced recently for both general anaesthesia² and sedation in combination with local anaesthesia. We conducted this study to characterize the safety, acceptability, and economy of local vs. general anaesthesia for outpatient laparoscopic sterilization.

Materials and methods

The study was approved by the Ethical Committee of the region and performed according to the Helsinki declaration. All women admitted to our department for outpatient tubal sterilization during an 11-month period were asked to participate in the study. All the patients received midazolam 0.1 mg kg⁻¹ intramuscularly for premedication. They were randomly allocated to the use of either

local or general anaesthesia just before the start of the procedure.

Local anaesthesia (LA group)

The patients received midazolam 0.05 mg kg⁻¹ iv before being prepared and draped in the dorsolithotomy position. Alfentanil 0.01 mg kg⁻¹ was given iv 1 min before the gynaecologist infiltrated the infraumbilical area with 15–20 ml of lidocaine 10 mg ml⁻¹ with adrenaline (5 µg ml⁻¹). An additional dose of alfentanil 0.01 mg ml⁻¹ was given before the peritoneal cavity was insufflated with carbon dioxide. The trochar was introduced, the peritoneal cavity visualized and 5–10 ml bupivacaine 5 mg ml⁻¹ was applied directly to each tube. Sterilization was performed by bipolar coagulation. The patients breathed room air in the first part of the study ($n = 43$) supplemented by 3 l oxygen min⁻¹ through nose catheter in the last part ($n = 22$).

General anaesthesia (GA group)

Anaesthesia was induced by alfentanil 0.01 mg kg⁻¹ iv and propofol 2.0 mg iv. Muscle relaxation and intubation were accomplished with atracurium 0.4 mg kg⁻¹ iv. Just before start of surgery the patients received alfentanil 0.01 mg kg⁻¹ iv. Anaesthesia was maintained with propofol iv infusion at a rate of 10 mg kg⁻¹ h⁻¹ for 10 min, reduced to 8 mg kg⁻¹ h⁻¹ thereafter. The patients were ventilated with 30% oxygen in air. By the end of surgery the propofol infusion was terminated and the patients

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Table 1. Observed and reported peroperative discomfort in the local anaesthesia group

	None %	Slight %	Medium %	Strong %
Observed discomfort				
Gynaecological examination	71	26	3	0
Local analgesia injection	82	18	0	0
Insufflation of CO ₂	73	17	0	0
Tubal diathermy	55	42	3	0
Movements on the table	71	29	0	0
Reported discomfort				
On recovery ward	62	30	5	3
In questionnaire	65	24	8	3

Table 2. Laparoscopic sterilization time

	General anaesthesia (n = 60)	Local anaesthesia (n = 65)	P
Preoperative time (fixed)	10	10	
Surgery time	16 ± 3 (12–23)	17 ± 4 (10–26)	NS
Post-surgery time	8 ± 3 (3–15)	3 ± 1 (1–7)	<0.0001
Total time	34 ± 1 (25–42)	30 ± 4 (19–36)	<0.0001

NS = not significant.

Data are presented as mean ± standard deviation (range), in min.

received neostigmine 2.5 mg and glycopyrrolate 0.4 mg iv.

All the patients were monitored with continuous ECG and pulse-oxymetry as well as regular blood pressure readings. The technique of surgery was the same in the two groups and the surgeons were all qualified gynaecologists. In the recovery room the patients were observed by a nurse who did not know the method of anaesthesia. The patients were discharged to the ward when they were mentally oriented and able to walk. In the afternoon they were discharged from the hospital when they wanted. One week after surgery, the patients returned a standardized questionnaire about their experience of the hospital stay as well as function and side-effects after discharge. They were assigned a wakeness score in the evening, a daylife-function score in the evening and day after, and an activity score the day after the procedure³.

Statistical evaluations were performed with Mann-Whitney test. $P = 0.5$ was regarded as the limit of significance.

Results

One hundred and fifty patients were asked to participate in the study. Twenty-five did not want to be included because they had specific anaesthesia preferences: 11 preferred local and 14 general anaesthesia. None were excluded after inclusion. There were no complications and no patients were readmitted. There were no differences in demographic data between the groups, mean age

was 39 ± 4 yr (mean ± standard deviation) mean weight 64 ± 9 kg. Patients in both groups were insufflated with 3.3 ± 1.0 l carbon dioxide.

Peroperative data

The observed peroperative discomfort was modest in the LA group (Table 1), but one in ten women characterized her discomfort as medium (8%) or strong (3%) in the post-surgery questionnaire. In the GA group no discomfort or awareness was observed or reported.

The effect of iv sedation in the LA group varied: 40% were awake all or most of the time, 41% were asleep during most of the procedure and 19% were partially asleep, partially awake.

Apnoea, defined as oxygen saturation at or below 85% in 30 s, was recorded during induction in 8% of the GA group. Because we recorded apnoea in 28 of the first 43 cases in the LA group (65%), the subsequent patients received oxygen 3 l min⁻¹ through a nasal catheter. In that group, apnoea was recorded in three women (14%). We found recurrent apnoea (oxygen saturation less than 90%) in five out of the first 43 cases (12%), but in none of the 22 women with a nasal catheter.

The preoperative procedure time was fixed and the surgery time was almost equal in the two study groups (Table 2). The post-surgery time was, however, significantly shorter in the LA group. The cost of drugs and anaesthetic disposable equipment was 2.2 times higher in the GA group than in the LA group (£26 vs. £11).

Table 3. Abdominal pain and discomfort after laparoscopic sterilization

	<i>General anaesthesia</i> (n = 60) %	<i>Local anaesthesia</i> (n = 65) %	<i>P</i>
Abdominal pain in the hospital			
Observed by the nurse	53	22	<0.001
Experienced by the woman	80	33	<0.0001
Analgesics administered*	33	14	<0.01
Sore throat observed			
In operating room	8	0	<0.05
In recovery room	10	0	<0.05
Reported by the woman	70	3	<0.0001

*In the general anaesthesia group, 85% of the analgesics were opioids; in the local anaesthesia group, 33% were ($P = 0.01$).

Table 4. Time from end of procedure to discharge from recovery and the hospital

	<i>General anaesthesia</i>	<i>Local anaesthesia</i>	<i>P</i>
Recovery time (min)	78 ± 44	71 ± 38	NS
Discharge from hospital (min)	273 ± 161	258 ± 72	NS

NS = not significant.

Postoperative data

During the postoperative hospital stay, the patients in the GA group had significantly more abdominal pain (Table 3) and received more and stronger analgesics. There was no difference between the groups in terms of shoulder pain, headache, nausea, or abdominal pain after discharge. Sore throat was reported more commonly among the intubated women (70% vs. 3%, Table 3). In the total series, postoperative nausea was reported by less than 10%, headache by 3%, and shoulder pain by 8% during hospitalization.

There was no difference between the groups in time of discharge from the recovery ward or discharge from the hospital (Table 4). The patients in the LA group were significantly more awake at home in the evening, wakefulness score of 4.3 ± 1.4 vs. 3.6 ± 1.4 ($P < 0.02$, wakefulness score 1–5; 1 = asleep all the time, 5 = awake all the time).

In spite of preoperative instructions, 40% of the patients travelled home alone, including 4% who drove their own car. Thirty-five per cent of the patients were alone at home for periods after discharge.

When asked after surgery whether the experience had been better, the same or worse than expected, 26% in the GA group and 36% in the LA group characterized it as better, 55% and 46% as equal, 19% and 18% as worse, respectively. In the LA group, 63% said they would prefer local and 20% general anaesthesia for a similar procedure in the future. In the GA group, 48% said they would prefer local and 21% general anaesthesia. The majority (81%) would prefer to be outpatients for a similar case, 15% would prefer to stay until the day after, 3% would prefer admittance the day before, whereas one

patient (1%) would prefer to stay in hospital both the night before and the night after the procedure.

Discussion

Both local anaesthesia with sedation and general anaesthesia proved to be safe and acceptable for the patient, the anaesthetist and the gynaecologist.

The main problem with local anaesthesia is the potential of patient discomfort during the procedure. Although many (42%) of our LA patients experienced discomfort, the discomfort was tolerable and comparable with the discomfort of the gynaecological examination at the start of the procedure. Discomfort may be controlled by iv sedation, but large doses of long-acting drugs may impair respiratory function or delay recovery. The occurrence of apnoea in the LA group is probably a result of the respiratory depressant action of opioids and benzodiazepines in combination. The respiratory stimulation from hypercapnia is more resistant to these drugs than is the stimulation from hypoxia⁴. Thus, administration of oxygen maintains an adequate level of oxygen in the blood until the hypercapnia response is activated. An important aspect is to titrate the iv sedation after clinical response. In our study all patients received a standard dose with large variations in effect. In the clinical situation, careful titration is recommended.

Improved analgesia in the first postoperative period in the LA group may be explained by the local anaesthetic drug effect on the tubes and the operation wound. This is confirmed by successful reports upon the application of local anaesthetics to the tubes in cases of general anaesthesia⁵. Apart from pain and sore throat after intubation, nausea and vomiting are the most frequent side-effects

after day-surgery laparoscopy⁶. In our study the figures of nausea and vomiting were low, less than 10%; and the patients met the discharge criteria from the recovery ward after 71–78 min. Rapid recovery and low incidence of nausea and vomiting is a general feature of regional or local anaesthesia⁷. However, apart from more sleepy patients in the evening, our results in the GA group were equally good in terms of emesis and recovery. The use of short-acting drugs (e.g. alfentanil, propofol, atracurium) is probably important in order to achieve rapid recovery with general anaesthesia^{2,8}. Some studies also indicate an anti-emetic effect of propofol, which may be important⁹.

Although we assigned a fixed time on preoperative preparations, we feel that preoperative preparation and perioperative surveillance is simpler with local anaesthesia than with general anaesthesia. This adds to the measured benefits of less time spent in the operating theatre and less costs of drugs and disposable equipment with the local anaesthetic method.

In spite of preoperative instructions, 40% of the patients travelled home alone. Thus, it seems mandatory to make specific questions about escort when the patients are discharged. This was not done by the hospital personnel during the study period, but is presently checked as a part of the discharge routines.

Our conclusion is that general anaesthesia should be offered on demand. For the great majority, however, local anaesthesia is advantageous: it is preferred by the patients, recovery is quick; the patients are less bothered by pain and sore throat postoperatively and feel more awake at home in the evening. From an economical

point of view, the time spent for surgery is shorter and anaesthesia costs are reduced.

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