

# Cardiac arrest: an unexpected complication during laparoscopic bilateral tubal ligation - a rare case report

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## Summary

Data consistently show that in experienced trained hands, laparoscopic tubal sterilization is safe and highly effective regardless of the approach or occlusive method. The known mortality rate is between four and eight deaths per 100,000 cases and the rate of intraoperative and postoperative major complications is less than 1%. The anesthetic complication rate for laparoscopy is between 0.016% and 0.75%. Carbon dioxide (CO<sub>2</sub>) pneumoperitoneum effects are still controversial. Here the authors present a case report of patient who suffered from intraoperative cardiac arrest during laparoscopic tubal ligation under general anesthesia. No definite cause has been identified. The authors outline several possible mechanisms that could have been involved and attempt to discuss these events in the face of published reports describing similar complications.

**Key words:** Laparoscopic bilateral tubal ligation; Cardiac arrest.

## Introduction

Tubal sterilization accounts for 40% of contraceptive methods used by women of reproductive age throughout the world [1-4]. However, despite the fact that laparoscopic tubal ligation remains to be an effective form of birth control throughout the world, cumulative failure rates remain high - from 18.0 to 18.8 per 1,000 procedures and patients should be appropriately counseled [4, 5]. Factors associated with increased failure are age under 30 years and the use of bipolar coagulation. Laparoscopic tubal sterilization with bipolar coagulation is a common and effective method of contraception but it has an inherent risk of failure [6]. Dilbaz *et al.* reviewed 461 patients who underwent interval tubal ligation. They explained that only two patients had complications related with general anesthesia, two patients had bleeding from the port-site, three patients had meso-salpingeal and meso-ovarian bleeding, one patient had bleeding from the vaginal wall, and one patient had intestinal burn [7]. Another study, to assess the complications of operative gynecological laparoscopy, reviewed a series of 2,140 operative laparoscopies. The overall complication rate was 17 / 2,140 (0.79%), and the major complication rate was 10 / 2,140 (0.46%) [8]. In the light of these studies, laparoscopy is considered a safe, effective, and cost-efficient outpatient procedure [9]. Cardiac arrest is an unexpected complication during laparoscopic tubal ligation. In this case report

the authors discussed a case of cardiac arrest that experienced an unexpected rare complication during laparoscopic bilateral tubal ligation.

## Case Report

A 40-year-old woman with grand multiparity was scheduled for laparoscopic tubal ligation. The patient had two previous unintended pregnancies with RIA so that she decided to have the operation. She was 160 cm high and weighed 80 kg. She had no abnormalities on physical examination and did not have any chronic disease such as hypertension or diabetes, and had normal complete blood count, fasting blood glucose, and also normal liver and renal function tests. She did not have any previous surgery, and any allergic reaction in her history. ASA physical status I was assigned to her.

General anesthesia was induced with 160 mg (two mg/kg) propofol, 48 mg (0.6 mg/kg) esmeron, and 80 µg (one µg/kg) fentanyl intravenous so that anesthesia accomplished without incident. A ten-mm trocar was inserted below the umbilicus in a pro-uterine direction. A five-mm accessory trocar was placed in the lower midline, three finger breadths above the pubic symphysis. After the insertion of the second trocar, the authors placed the patient in a Trendelenburg position and insufflation of the abdomen with CO<sub>2</sub> gas was begun. During the creation of CO<sub>2</sub> pneumoperitoneum, cardiac arrest occurred within minutes; thereafter the anesthetist administered one mg of atropine. The patient's pulse rate was 85 beats/minute. Her respiration rate was 12/minute, but within minutes the pulse and blood pressure became unrecordable and she gradually progressed to cardiac arrest. All of these parameters normalized after desufflation. After the vital signs of the patient normalized, CO<sub>2</sub> insufflation of the abdomen was resumed.

The authors attempted to complete the operation with minimal gas insufflation. Insufflation was performed with intra-abdominal pressure approximately < ten mm Hg. They applied bipolar coagulation and then the tubes were cut. There was no further intraoperative complication, such as bleeding. After controlling abdominal peritoneum the authors completed the operation and desufflation had finished without any complication. No definite cause could be identified. The patient was extubated without any problems. She was discharged the next day from the operation.

## Discussion

A study by Gupta analysed 4,500 cases of laparoscopic sterilization and reported only one case with cardiac and respiratory arrest, but the patient was revived and there was no mortality [10]. Similar cases are rarely reported in the literature. In the present case the authors thought that the creation of CO<sub>2</sub> pneumoperitoneum may have been involved in the development of the cardiac arrest because this complication occurred within minutes of CO<sub>2</sub> insufflation. Increased intraperitoneal pressure has been postulated as a cause of hypotension. Venous return from vena cava inferior is impaired with a consequent decrease in cardiac output as a result of increased intraperitoneal pressure. Galizia *et al.* investigated cardiopulmonary changes in patients subjected to different laparoscopic surgical procedures for cholecystectomy and they found that gasless laparoscopy had higher reliability in high-risk patients with absence of any cardiopulmonary alterations [11]. Berg *et al.* analyzed 40 patients with no history of cardiopulmonary disease. They reported that central venous pressure increased by more than 200% after CO<sub>2</sub> insufflation. There were also other observed changes, such as heart rate, central venous pressure, and arterial blood pressure which may have been caused by altered by CO<sub>2</sub> insufflation and/or the various positioning of the patients. They concluded that the procedure must be performed more carefully in patients with concomitant history of cardiopulmonary disease [12]. Vagal stimulation could be a cause of cardiac arrest together with increased intraperitoneal pressure and Trendelenburg position. All may cause a tightened diaphragm.

The anesthetic type must be chosen according to the patient. Local anesthesia, with or without preoperative medication, is an excellent option associated with a lower complication risk, reduced cost, and shorter, easier recovery [1]. The American Association of Gynecologic Laparoscopists showed that only 5.1% of its members performed office-based laparoscopy under local anesthesia [13]. However, office-based laparoscopy and gasless laparoscopy are not new procedures and low-pressure pneumoperitoneum is also painful. By contrast, a zero-pressure (gasless) pneumoperitoneum is painless [14]. In a randomized study Børdahl *et al.* recommended local analgesia to the majority of patients as well as to the gynecologists. Because with this type of anesthesia the operation time was less, postoperative recovery was quicker, and the women were less afflicted by

abdominal pain and sore throat, and also minimal complication [15]. Consequently, cardiac arrest, that is a quite rare complication of bilateral tubal ligation, is thought to develop due to CO<sub>2</sub> insufflation in this case. Laparoscopic tubal ligation can be performed with local or general anesthesia in patients without a history of cardiopulmonary disease. The present authors believe that gasless laparoscopy is a more appropriate approach in patients with a cardiopulmonary disease history.

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