A QUICK METHOD OF STERILIZING LAPAROSCOPE USED IN 1,27,726 FALOPE RING TUBAL LIGATIONS

by

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Introduction

Asepsis is the most important factor in any surgical procedure no matter how short and simple it may be. Infection due to lack of asepsis can negate all the benefits of the surgery. Therefore, sterilization of all the instruments used must be carefully carried out.

In endoscopy the laparoscope can be sterilized by either one of the following methods:

(1) Steam autoclaving
(2) Gas autoclaving for 2 hours
(3) Exposing to formalin vapours for at least 10 hours and
(4) Soaking in activated dialdehyde solution for minimum of 20 minutes.

Time is a very important factor in mass laparoscopic tubal ligation when an operation is performed every minute. In developing countries like India, to meet the challenge of population explosion, sterilizations have to be done on a war footing. Therefore, when more than one tubal ligation is to be done, sterilization of laparoscope in between operations by the above methods becomes cumbersome. The commonest method used is to cold sterilise the instruments in activated dialdehyde for ten minutes and then rinse at least twice in sterile water. In addition to the time factor, the other disadvantages of all the above methods discussed later, prompted us to seek a quick, efficient and cheap method of sterilizing the laparoscope in between two successive operations.

This method was used for 1,27,726 laparoscopic sterilizations done in mass camps organized by State Governments of Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Punjab, Bihar and Orissa and supervised and followed-up by the respective District Health Officers.

Material and Methods

The laparoscope and all the accesories were exposed to formalin vapours released from 10 dialdehyde tablets, in an air tight container overnight. After each procedure the laparoscope, trocar and needles were cleaned with hot water and swabbed with spirit. At the end of the camp the instruments were thoroughly cleaned with diluted Savalon solution and hot water. Following this they were kept in formalin vapour container overnight.

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The samples for this study were collected from 22 women who opted for voluntary laparoscopic tubal ligation at the Mission Hospital, Dhuliya on 14th August, 1982.

The following swabs were collected during the operative procedure at successive steps.

A—From the skin after cleaning with soap, iodine and spirit.

B—From the trocar and laparoscope immediately on removal from the abdominal cavity on completion of the tubal ligation.

C—Following the completion of ligation, from the trocar and laparoscope after cleaning with hot water at a temperature 45° to 50°C.

D—From the trocar and laparoscope, after cleaning it with rectified spirit following rinsing with hot water.

Swabs were also taken from the surgeon's gloves and needles used for the pneumoperitoneum. Hot water used for cleaning of trocar and laparoscope was also examined for bacteria.

All the swabs from the various sites were immediately inoculated into glucose broth and thioglycollate broth (pre-reduced medium was used). The glucose broth was incubated for 24 hours and observed for growth, which was further inoculated on Mac Conkey's agar and blood agar and the colonies were identified by the methods described by Cowan and Steel (1974) for aerobic growth. The thioglycollate broth was incubated for 72 hours and later on processed on Neomycin blood agar and incubated anerobically and the organisms identified as described by Willis (1977).

Results

Out of 154 swabs collected from 22 women in four various steps, growth was observed in only 5 swabs and organisms identified are tabulated in Table I.

Incidentally no growth of organisms was observed more than once in various steps in the same case. There was no anaerobic growth in any of the cases.

No organisms were grown from the gloves, needles or water used during the operation.

Discussion

The importance of proper cleaning of operating instruments cannot be overstressed. Instruments must be cleaned by a method that will remove all traces of original soil, assure no residual precipitation of the cleaning agents and kill all live bacteria. Growth of bacteria requires a satisfactory inoculation of the contami-

TABLE I

Site of Swab	No. of cases showing growth	Organisms identified
A—Skin after cleaning	1 (Case No. 7)	Staph. albus (Coagulase -ve)
B—Trocar and laparoscope after ligation	1 (Case No. 12)	Pseudomonas
C—Trocar and laparoscope after washing with hot water	2 (Case 8 & 17)	Pseudomonas
D—Trocar and laparoscope after cleaning with spirit	1 (Case No. 14)	Staph. citreus (Coagulase -ve)

nant. Also, the site of primary inoculation and the direction of the initial spread of infection are largely determined by the portal of entry to the body and by the local anatomy. Thus bacteria which are potentially pathogenic may enter the underlying tissues through the laparoscope giving rise to superficial wound infection or to localised or generalised peritonitis.

In mass laparoscopic tubal ligation camps, when on an average 300 to 400 sterilizations are performed, with a limited number of laparoscopes prolonged methods of sterilizing instruments such as gas sterilization or cold sterilization are not practicable.

Gas autoclaving requires the instruments to be exposed to the vapours of ethylene oxide for two hours. Added to this are several hours of aeration to avoid burns of the skin and the intra-abdominal organs due to the caustic gas. Moreover, these units are not portable and costly. Frequent hot steam sterilization is not feasible for all endoscopic equipment because it destroys the plastic tubings, gaskets and washers and also damages joints of the optical system.

In comparison, short term cold sterilization becomes of great practical importance. The most commonly available method for short term cold sterilization is soaking the instruments in a solution of activated dialdehyde solution for a minimum of ten minutes. This is followed by a thorough rinse in sterile water because the activated dialdehyde is caustic and is harmful to the skin, intraabdominal organs and to the eyes of the laparoscopist. Frequent soaking also affects the seal of the optical equipment as well as the coating of the optic surface. Droplets may also seep through the eye piece, more commonly through the end of the telescope, as the glue of the lens system dissolves.

We, therefore, used the above method and did bacteriological studies to ensure achievement of proper asepsis. Of the 22 operations when bacteriological studies were done at the different steps during the operation procedure, growth of bacteria was observed only in very few cases (Table I) who did not develop wound infection or peritonitis.

Spence *et al* (1978) did an experimental bacteriological study of plastic cannula used for pregnancy termination. In this study, pieces of the cannula were first incubated for 24 hours in a culture of *E. Coli*, N. gonorrhea, B haemolytic streptococci and B. fragilis. After 24 hours the pieces of the cannula were placed in a solution of 10% fomalin, 75% alcohol, 95% alcohol, Cidex and 2% tincture iodine solution for 1,5,10 and 20 minutes, washed in saline and then both the rinsing solution and the cannulae were examined for growth. Their results clearly demonstrated that minimum of 10 minutes of soaking in 95% alcohol, Cidex and 2% tincture iodine for 20 minutes time was sufficient to kill live bacteria.

In this study, though an occasional swab showed growth, none of the women had any clinical disease. This could be probably due to the host resistance as they all were healthy individuals. Secondly, the time taken for the procedure was too short for an adequate seeding of the tissues by the organisms and above all there was no blood, serum or necrotic tissue to provide a substrate for the multiplication of the small number of organisms.

Among the 1,27,726 laparoscopically sterilized women by one of the authors (PVM) from January 1979 to March 1983

only 1660 i.e. 1.3% reported of superficial wound infection only.

In big Institutions where proper facilities for sterilization of instruments including pre and post operative case are available, the rate of infection following surgery is as high as 53% (Diwalkar *et al,* 1982) and as low as 7 to 12% (Saraogi *et al,* 1982, Shahul *et al,* 1982). These facilities are undoubtedly not available in the rural camps where 300 to 400 laparoscopic sterilization are required to be carried out in improvised operation theatres (in Civil hospitals, Primary Health Centres and even sometimes schools). Hence this is a quick, practicable and effective mehtod of sterilization of the laparoscope in camp situations.

Summary

A quick method of cleaning the laparoscope in hot water and swabbing with spirit was used to sterilize the laparoscope in between two consecutive Falope Ring tubal ligation procedures in mass rural camps.

Present bacteriological study and our clinical observations suggest that this quick method of sterilizing the laparoscope is efficient, safe, simple, economical and very suitable for mass rural tubal ligation camps.

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