

ALTERATIONS IN PLASTIC CANNULA ON REPEATED USE FOR SUCTION EVACUATION*

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Introduction

The disposable plastic Karman's cannula is generally preferred over metal cannula which is heavier and more rigid. Pre-sterilization with Gamma rays adds to the cost of the plastic cannula. In view of the large numbers required and cost per piece, its repeated use is practiced in the developing countries.

Present study is undertaken to study the changes in physical characteristics of cannula on repeated use and chemical sterilization with Cidex 2%.

Material and Methods

Fifty new Karman's plastic cannulae of size 6-12 mm were used. Each cannula was numbered with the help of glass marker pencil for their identification during the subsequent usages. These were used in 210 cases undergoing first trimester termination of pregnancy.

The first appearance of cracks and fissures was noted after each use of the cannula. The stiffness of cannula was measured by fixing it on section paper on

a drawing board with pins. Cannula was kept along the ordinate of the section paper and fixed at two points A and B. The point B was kept at a fixed distance from the tip of the cannula. A point C on the abscissa of section paper was chosen at fixed distance from Point B. With the help of calipers whose one end was kept at the tip of the cannula and the other end at point C, pressure was applied at the tip of the cannula by bringing it towards the point C by a fixed distance, till a kink was produced. The stiffness was measured by measuring the horizontal distance between the ordinate and the tip of the cannula. This distance was referred as "Collapse Distance." The angle formed by the fenestrated tip of the cannula with its stem was measured in degrees and termed "Angle of Kink." (Fig. 1).

Observations and Results

Table I shows the distribution of cases according to the serial number of use of the cannulae and their diameter. It shows that the 8 mm and 10 mm diameter cannulae are most frequently used. Out of a total of 10 cannulae of 6 mm diameter cracks appeared in 2 after being used twice only. Because of intrequent use of 6 mm diameter cannulae only 1 cannula could be followed up for repeated use, which also got cracked at 13th use and

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TABLE I
Distribution of Cases According to the Serial Number of Use of the Cannulae and their Diameter

| Serial Number of use of Cannulae | No. of cases studied | | | |
|--|----------------------|-----------------|------------------|------------------|
| | 6 mm cannula | 8 mm cannula | 10 mm cannula | 12 mm cannula |
| 1 | 10 | 14 | 22 | 4 |
| 2 | 9 | 10 | 19 | 2 |
| 3 | 1 | 5 | 4 | — |
| 4 | 1 | 5 | 4 | — |
| 5 | 1 | 5 | 4 | — |
| 6 | 1 | 5 | 4 | — |
| 7 | 1 | 5 | 4 | — |
| 8 | 1 | 5 | 4 | — |
| 9 | 1 | 5 | 4 | — |
| 10 | 1 | 5 | 4 | — |
| 11 | 1 | 5 | 4 | — |
| 12 | 1 | 5 | 2 | — |
| 13 | 1 | 5 | 2 | — |
| 14 | — | 5 | 1 | — |
| 15 | — | 5 | — | — |
| 16 | — | 3 | — | — |

hence discarded for further use. In the 8 mm diameter cannulae cracks appeared in 2 out of 14 after the 15th use. No cracks appeared in any of the 10 mm diameter cannulae even after the 14th use. Only 4 cannulae of 12 mm diameter were used and that too only twice.

Table II and Table III show the variation of the angle of kink and the collapse distance respectively, on repeated use of the cannulae of various diameters.

In the present study, the first appear-

ance of kink after repeated use varied with the diameter of the cannulae used. In 6 mm and 8 mm diameter cannulae kink appeared even in the new cannulae and became more acute with repeated use. In 10 mm diameter cannulae kink appeared for the first time after 10th use. In 12 mm diameter cannulae no kink was observed as these cannulae were used only twice.

For the 6 mm diameter cannulae the average angle of kink for the first five

TABLE II
Average Angle of Kink (Degrees) for Various Diameter Cannulae

| Diameter of cannula | Average angle of kink (degrees) with number of times cannula used (Mean \pm S.D.) | | |
|------------------------|--|------------------|---------------------|
| | 1-5 usages | 6-10 usages | More than 10 usages |
| 6 mm | 97.4 \pm 1.09 | 93.6 \pm 1.15 | 88.0 \pm 0.0 |
| 8 mm | 123.1 \pm 0.97 | 120.4 \pm 1.36 | 116.4 \pm 2.43 |
| 10 mm | — | — | 132.7 \pm 1.36 |

TABLE III
Average Collapse Distance (cms.) for Various Diameter Cannulae

| Diameter of cannula | Average collapse distance (cm) with number of times cannula used (Mean \pm S.D.) | | |
|---------------------|--|----------------|---------------------|
| | 1-5 usages | 6-10 usages | More than 10 usages |
| 6 mm | 5.4 \pm 0.66 | 5.0 \pm 0.56 | 4.2 \pm 0.89 |
| 8 mm | 7.4 \pm 0.68 | 7.1 \pm 0.31 | 6.7 \pm 1.29 |
| 10 mm | — | — | 8.5 \pm 0.91 |

usages was 97.4°, it became 93.6° for the next five usages and 88.0° for more than 10 usages. Similar trend was observed for 8 mm and 10 mm diameter cannulae (Table II). Average collapse distance for the 6 mm diameter cannulae for the first five usages was found to be 5.4 cm, it decreased to 5.0 cm for the next five usages and 4.2 cm for more than 10 usages. Similar trend was observed for the 8 mm and 10 mm diameter cannulae (Table III). It is observed that the average angle of kink and the average collapse distance decrease on repeated use of the cannulae. This is more marked in the cannulae of smaller diameters.

Comments

Plastic cannulae cannot be autoclaved and boiled although that would be the most reliable method of sterilization. Cidex 2% is considered to be an ideal germicide at present (Stonehill *et al*, 1963).

The tip of the cannula used for suction evacuation gets broken between the two triangular openings because this is the weakest portion of the cannula. Occasionally cases have been reported of the breaking off of the tip of the cannula in-

side the uterine cavity on repeated use (Population report series, 1973).

In general hospital plastic Karman's cannula may be used repeatedly after chemical sterilization, but it should be checked for any cracks and fissures prior to use.

Smaller diameter cannulae are more flexible and tend to get kinked early. A 6 mm diameter cannula gets kinked even when it is new. The 8 mm and 10 mm diameter cannulae could be used for 16 and 14 times respectively. In 10 mm cannulae kink occurred for the first time after 14th use. Flexibility of the cannulae also vary inversely with their diameter.

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See Fig. on Art Paper V