LAPAROSCOPIC APPENDECTOMY LEARNING CURVE FOR A SINGLE SURGICAL TEAM IN SENEGAL: A CUMULATIVE SUM (CUSUM) ANALYSIS OF OPERATIVE TIME

Abdourahmane Ndong* MD, MPH, MSc[1], Adja C. Diallo MD, MPH, MSc[1], Armaun D. Rouhi BA[2], Diago A. Dia MD[1], Sebastian Leon MD, Jacques N. Tendeng MD[1], Noel N. Williams MD[2], Mamadou Cissé MD[1], Kristoffel R. Dumon MD, FACS[2], Ibrahima Konaté MD[1]

Background

Laparoscopy has a clear patient benefit related to postoperative morbidity but may not be as commonly performed in low-resource countries. The decision to convert to laparotomy can be complex and involve factors related to the surgeon, patient, and procedure. A study of these factors would allow better preparation and preoperative planning to reduce the risk of complications. The objecive was to analyze the factors associated with conversion to laparoscopic surgery in a low-resource setting.

Research Methods

This single-center prospective study included patients who underwent laparoscopic appendectomy at a tertiary care institution in Senegal(West Africa).

To assess the learning curve, the operative times for each procedure were analyzed chronologically.

The **CUSUM method was used for quantitative assessment of the learning curve by calculating the running total of differences between individual data points and the mean of all data points**. Statistical analysis was conducted using R software.

Results

81 patients wee included out of 153 laparoscopic surgeries performed (52.9%).

The mean age was 26.7 years with a sex ratio of 1.9.

Per-operative severity according to AAST was:

- **Grade I (acutely inflamed appendix intact) in 75.4% (n=61)**
- **Grade III (local contamination) in 7.4% (n=6)**
- **Grade IV (peri-appendiceal phlegmon) in 6.1% (n=5)**
- **Grade V (generalized peritonitis) in 11.1% (n=9).**

Conversion occurred in 5 cases (6.1%). Morbidity was observed in 3.7% (n=3). There were no deaths.

The average operative time was 76.8 minutes (30-180). The CUSUM analysis of the learning curve for operative time showed that a steady operative time was achieved after **28 procedures.**.

Conclusion

The CUSUM analysis demonstrated that the learning curve was surmounted after 28 cases, in our study.

This analysis should be generalized to all other procedures and individualized by the surgeon in our context to contribute to better surgical performance and patient outcomes.

Figure 1: Cumulative cum control chart of operative time (n=81)

