

## Time-Motion Study to Audit Minor Endoscopy Operation Theatre time Utilization



### Medical Science

**KEYWORDS :** Time-motion study, Medical audit, endoscopy, Lap TL

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### ABSTRACT

*Aims: To do medical audit in Minor Operation Theatre time management by Time-motion study. Material & methods: The present Time-Motion study was done to audit Operation theatre time management. The study was conducted in Shrimati Kashibai Navale Medical College & General Hospital, Narhe, Pune(MS). This pilot study was done in minor endoscopy operation theatre of the department of Obstetrics & Gynaecology. Timings of various steps starting from patient being taken in OT to shifting out were recorded by an independent observer. The data collected were analyzed by statistical methods. Results: The delay was recorded in all the steps, but significantly so in three steps, namely in a) total procedure time, b) closure to recovery of anaesthesia and c) recovery of anaesthesia to shifting out of theatre. The reasons for delay were: a) procedures done by junior or senior residents, b) anaesthesia managed by anaesthesia residents, c) equipment failure, and d) Supporting staff lacunae. Conclusion: In teaching hospital scenario, training of residents is very important. Hence in initial period, delay in few steps is reasonable. As residents get trained, these delays will be abolished. Keeping equipments in good working conditions is of paramount importance. Presence of senior faculty from the start of the work would facilitate and hasten motion. And also trigger efficiency of supporting staff*

### INTRODUCTION

We are working in Shrimati Kashibai Navale Medical College & General Hospital ( SKNMC & GH ), Narhe Pune. The institute is six years old with admission to a hundred students every year for MBBS course. Our hospital drains large area of rural and urban Pune. Although a private medical college, world-class services to patients are totally free, resulting in heavy workload. There is a large waiting list for major & minor surgeries. To cope up with this, without jeopardizing training junior & senior residents, time-management in operation theatre is very important. This initiated us in auditing time management in minor endoscopic operation theatre. This is a pilot study of 30 patients.

### MATERIAL AND METHODS

The study was conducted at SKNMC & GH, in Department of Obstetrics & Gynaecology from June 2012 to August 2012. It was a prospective study of elective cases undergoing medical termination of pregnancy with Laparoscopic tubal ligation ( MTP- Lap TL ). A total of thirty cases of the same were selected randomly for Time-Motion study ( T-M ). Ethics committee of the Medical College approved the study.

### INCLUSION CRITERIA:

All the women undergoing MTP-LAP TL during main author's Endoscopy operation theatre day.  
Presence and availability of independent observer for time keeping.

### EXCLUSION CRITERIA:

Non- availability of independent observer.

Timing of following were recorded by independent observer present in the OT:

Shifting in OT to induction of anaesthesia.  
Induction of anaesthesia to incision.  
Incision to time of entry of lapascopy port in the abdomen.  
Port entry to closure of abdomen.  
Time required for additional procedure of MTP.  
Timing of recovery from anaesthesia.  
Recovery from anaesthesia to shifting out of OT.  
Other data such as availability of technician, problems during procedure along with regular patient details were recorded.  
All the data were analyzed statistically.

### RESULTS

Age group of women undergoing procedure is as shown in the **table 1**.

Age group	Number of women (Percent of total)
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20-25	10 (33.33%)
26-30	13 (43.33%)
31-35	6 (20%)
36-40	1 (3.33%)
Total	30

Obstetric history of women undergoing procedure is shown in **Table 2**

No of children	No of women
1	3 (10%)
2	20 (67.67%)
3	5 (16.67%)
4	2 (6.67%)
Total	30

Weight of women is as shown in **table 3**.

Weight of women ( Kg )	No of women (Percent of total)
31-40	11 (36.67%)
41-50	11 (36.67%)
51-60	5 (16.67%)
61-70	2 (6.67%)
Above 70	1 (3.33%)
Total	30

There were 2 cases of previous caesarian sections, one with 1 caesarian section and one with 2.

The Table 4 shows the average, median and standard deviation of duration of each step in OT and No of cases in which delay occurred

Values(Minutes)	Steps ( Minutes)*								
	1	2	3	4	5	6	7	8	9
Average	10.67	12.4	5.07	11.13	9.97	20	29.9	8.87	6.73
Median	10	12	3.5	9	10	16	24.5	7	5
STDEV	4.26	6.77	5.65	8.4	4.84	8.81	12.2	4.38	3.81
Upper Limit Median+STDEV	14.26	18.98	9.15	17.4	14.84	24.81	36.73	11.38	8.81
Delay in No cases	2	3	2	2	1	4	6	5	5
Percent of total (30)	6.67	10	6.6	6.67	3.33	13.3	20	16.67	16.67

In deciding upper limit of usual duration required for particular step, we are taking in consideration median + STDEV (standard deviation) values. Median denotes the most frequent value for particular step, telling us the usual time taken for that particular step. Average is affected by extreme values. Hence, the delay is considered if the duration taken for a particular step exceeds the sum of Median and Standard deviation.

\*---The steps:

1. Shifting to OT to Induction of anaesthesia.
2. Induction of anaesthesia to incision.
3. Incision to entry of laparoscopy port.
4. Procedure time.
5. Additional procedure time
6. Incision to closure time.
7. Total time required for the procedure
8. Closure to recovery of anaesthesia.
9. Recovery to shifting out of OT.

**FINDINGS:**

A total of 15 cases had delay in one or the more steps. These cases have been analyzed by categorizing these into those done by either junior or senior registrars & done by senior consultants. Delay occurred in cases which were operated by JR or SR. Most delays occurred in steps 7,8 and 9.

Delay in step 1 (2 cases) eg. Shifting to OT to Induction of anaesthesia was probably because anaesthetists were residents. Type of anaesthesia, one spinal and the other general.

Delay in step 2 (3 cases) eg, Induction to incision, occurred in 3 cases. All the cases were operated by residents. Supporting staff help may not be optimal.

Delay in step 3 (2 cases) eg. Incision to entry of laparoscope port. Cases operated by residents, needing more training.

Delay in step 4 (3 cases) eg. Time required for Laparoscopic procedure. Delay due to obesity other two operated by junior resident.

Delay in step 5 (1 cases) eg. Time required for MTP, due to suction failure with Laparoscope in place caused delay.

Delay in step 6 (4 cases) eg. Time required from incision to closure- 3 cases by junior, 1 by senior resident. 1 patient was obese and needed mini-laparotomy. One had nonworking camera.

Delay in step 7 (6 cases) - Time required for both MTP & Lap TL added because of causes already discussed.

Delay in step 8 (5 case) - Closure to recovery from anaesthesia. As cause of delay 1 was given spinal as she was obese but required heavy sedation. Other three had reversal delay.

Delay in step 9 (5 cases) - Delay in shifting out of OT depends entirely on supporting staff.

**DISCUSSION**

Time-management in Operation Theater depends on several factors such as

1. Skills & experience of surgeon
2. Skills & experience of anaesthetist
3. Condition of surgical equipment
4. Efficiency of supporting staff
5. Efficiency as far as team management is concerned.
6. Patient factors, though not modifiable.

Being a teaching institute, training residents is our main aim. Laparoscopy is a skill that needs to be taught with great care due to its inherent complications. So corrective measures to avoid delay due to residents performing surgery is not a viable solution. Only step 1 & 9 are modifiable as they are dependent on supporting staff. This fact has been highlighted by Geryane1 .

As against finding of Ricketts2 , where Friday ended in quicker surgeries, our reasons have been very ethically correct. As anaesthetists are also training their residents, delay in induction & recovery from anaesthesia cannot be modified. Adequate & motivated supporting staff will help us tide over time crunch.

As the residents get trained, delays will become fewer & more minor surgeries can be done in a day's schedule. Presence of senior faculty from the start of list too will ensure supporting staff & residents to move quickly.

Publications on Endoscopy theatre timing survey are not available in Indian literature. Such Medical audits are very essential so that theatre time management can be improved, especially when workload is tremendous.

**CONCLUSIONS**

For better time utilization in Operation theatre can be achieved by

- a) Intensive training of residents.
- b) Keeping equipments in good working conditions.
- c) Encouraging efficiency of supporting OT staff.
- d) Presence of senior consultants from the start of the surgery list.

**REFERENCE**

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