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## Efficacy of Anesthesia Clinic on Preoperative Evaluation, Preparation and Related Costs

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### ABSTRACT

**Background:** "Anesthesia Preoperative Evaluation Clinic" (A.P.E.C) is a center for pre-operative evaluation and preparation of the patients. The aim of this clinic is to obtain the essential data and history of the patient, optimize her/his condition in case of any co-existing disease before the operation and select the best method of anesthesia for the day of surgery.

**Materials and Methods:** In an interventional quasi experimental study, pre and post operative para-clinical procedures which have been performed for patients having elective surgery were evaluated before and after establishing the APEC (1998 and 2001) in Labbafinejad Medical Center. After obtaining the demographic data including age, sex, ASA class and the type of surgery, two-hundred patients were placed in two groups. Information about the para-clinical results and requested medical consultation were recorded from the patients' files. All costs and expenses were recorded for both two groups. After obtaining the data including the percentage of para-clinical procedure, chest x-ray, ECG, ASA class, type of surgery and postponed operations before and after establishing the APEC, they were compared by chi-square test. Bed-day occupying factors and costs in both groups were compared by t-student test.

**Results:** There were no significant differences between the 2 groups in terms of sex, ASA class and type of surgery. The number of admitted patients' in the year 1998 was about three times more than the year 2001 (2.11 days versus 0.55 day) ( $p=0.000$ )

Chest x-ray was ordered for 18 %of the patients in the year 1998 group, whereas it decreased to about 0% ( $P=0.000$ ) for the year 2001 group. The number of ordered medical laboratory exams in group 2 (2001) was significantly less than group 1(1998).Laboratory investigations were as follows: BUN ( $P=0.016$ ), FBS ( $P=0.000$ ), CBC ( $P=0.004$ ), ESR ( $P=0.006$ ), creatinine ( $P=0.000$ ), urine analysis ( $P= 0.000$ ), urine culture ( $P= 0.000$ ), cholesterol ( $P=0.000$ ), triglyceride ( $P=0.000$ ).Medical consultations in group 2 were less than group 1 (chi-square=154.7,  $P=0.000$ ).Comparison of the peri-operative costs in all aspects showed a decrease after establishing the anesthesia clinic ( $P<0.000$ ). Number of the operations cancelled by anesthesiologists had been decreased to 0 in group 2.

**Conclusion:** Regarding our findings, establishment of the anesthesia clinic is essential and cost-effective. The study showed that anesthesia clinic prevents extra expenses and time consuming and unnecessary paraclinical procedures which will be ordered only in necessary and consulted cases. Date of operation will be defined after optimizing the patient's conditions to prevent unnecessary admission of patients, bed-occupying rate and postponed surgeries. It will save the precious time of physicians and hospital personnel and reduce the mortality and morbidity rate. (Tanaffos 2004; 3(12): 63-68)

**Keywords:** Anesthesia clinic, Paraclinical procedures, Medical consultations, Paraclinical procedures costs

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## INTRODUCTION

Evaluation and preparation of the patient before the operation is performed in order to obtain medical history and necessary information about him/her, optimize patient's condition and select the best method of anesthesia on the day of surgery.

Several studies showed that evaluation of patient by taking medical history and physical examination to detect the co-existing diseases is more effective than performing series of routine medical laboratory tests(1). Moreover, unnecessary tests are an additional risk to the patients that would create medico-legal problems for both the physician and institution. For example, several studies showed the detection and treatment of anemia or hypokalemia or other disorders with no symptoms which had no positive effect on anesthesia and surgery and these false positive tests only led to increased risk of blood transfusion, potassium infusion or other invasive diagnostic procedures(2). Also an unnecessary chest x-ray can detect a trivial lesion which needs no treatment and causes the patient to undergo unnecessary pulmonary biopsy and its related morbidity (3, 4, 5).

Moreover, unnecessary para-clinical procedures are often expensive and not cost-effective. Several researches have indicated that establishing the anesthesia preoperative evaluation clinics (A.P.E.C) was effective in reducing the peri-operation costs and upgrading the anesthesia and surgical cares (6). Regarding the above mentioned items and absence of APEC in majority of clinical and educational centers of Iran, this study was approved in "National Research Institute of Tuberculosis and Lung Disease" in 2003.

The aim of this clinic is to obtain the essential data and history of the patient, optimize her/his condition in case of any co-existing disease before the operation and select the best method of anesthesia for the day of surgery.

## MATERIALS AND METHODS

In an interventional quasi experiment, pre and

post operative para-clinical procedures which have been performed for the patients undergoing elective surgery were evaluated before and after establishing the APEC (1998 and 2001). Two hundred patients were placed in the two groups after obtaining the demographic data including age, sex, ASA class, and the type of surgery (A,B,C). Types of surgery are as follows:

*Type A:* minimally invasive operation with minimal morbidity rate with rare physiological disorders which can seldom lead to blood transfusion, invasive monitoring and postoperative intensive cares.

*Type B:* moderately invasive operation which can lead to mild to moderate physiological disorders and probable need for blood transfusion, invasive monitoring and postoperative intensive cares.

*Type C:* highly invasive operation which can lead to severe physiological disorders and often needs blood transfusion, invasive monitoring and post-operative intensive cares.

All information in regard to the para-clinical results and requested medical consultations were recorded from the patients' files. All costs and expenses were recorded for both groups. The obtained data including the percentage of para-clinical procedures, chest x-ray, ECG, ASA class, type of surgery and postponed operations before and after establishing the APEC were compared by chi-square test. Bed-day occupying factor and the costs in both groups were compared by t-student test. P-value < 0.05 has been considered as significant. Data were analyzed using SPSS software (version 11.5). The study was performed on 200 patients in each period of time (before and after establishing APEC).

## RESULTS

There were no significant differences between the 2 groups in terms of sex, ASA class, and type of surgery. The average number of day- admitted patients in 1998 was about three times more than the year 2001 (2.11 days versus 0.55 day) ( $t= 948.3$ ,

P=0.000)

Chest x-ray was ordered for 18% of the patients in group 1(1998) whereas it decreased to 0 for group 2(2001).

The number of ordered medical laboratory exams in group 2 was 19% less than group 1 which was significant. The statistically significant differences in two groups have been demonstrated separately in

table 1 and Figure1.

Cardiac consultation was performed in the year 1998 for 128 patients (64%) and reduced to 10 patients (5%) in the year 2001 (chi-square=154.7, P=0.000).

Comparison of the peri-operative costs in all aspects showed a reduction after establishment of anesthesia clinic (table 2).

**Table 1.** Comparison of the number and percentage of para-clinical procedures of the patients having surgery in 1998 and 2001 in Labbafinejad Medical Center – Tehran

Para-clinical procedure	1998		2001		Chi-square, P-value
	Number	percentage	Number	percentage	
CBC	153	76.5	113	56.2	18.46, P=0.000
FBS	149	74.5	111	55.2	16.33, P=0.000
BUN	150	75	112	55.2	45.16, P=0.000
Cr	134	67	111	55.2	5.85, P=0.016
U/A	128	64	11	5.5	151.6, P=0.000
U/C	10	5	0	0	
ESR	12	6	0	0	
Cholesterol	15	7.5	3	1.5	8.44, P=0.004
Triglyceride	14	7	3	1.5	7.5, P=0.006

**Table 2.** Comparison of the peri-operative costs for the patients having surgical operation in 1998 and 2001 in Labbafinejad Medical Center – Tehran

	Price(Rls)	Number (1998)	Price(Rls) (1998)	Number (2001)	Price(Rls) (2001)	Ratio 1998/2001
Chest x-ray	29220	25	730500	1	29220	25.0
EKG	14430	74	1067820	63	909090	1.2
CBC	8820	79	696780	63	555660	1.3
FBS	4300	79	339700	61	262300	1.3
BUN	3420	78	266760	59	201780	1.3
Cr	4850	72	349200	58	281300	1.2
Na	5730	6	34380	16	91680	0.4
K	5730	6	34380	16	91680	0.4
Ca	6400	2	12800	1	6400	2.0
P	5620	1	5620	1	5620	1.0
ABG	21000	2	42000	1	21000	2.0
PT	7440	3	22320	1	7440	3.0
PTT	7440	3	22320	1	7440	3.0
LFT	29000	0	0	1	29000	0.0
U/A	4740	65	308100	4	18960	16.3
U/C	8820	6	52920	1	8820	6.0
TOTAL		501	3985600	348	2527390	1.6

## DISCUSSION

The results of this study indicate a reduction in requested para-clinical procedures, cardiac consultations, bed-day occupation and peri-operative costs for both patients and medical centers, and finally point out the necessity and effectiveness of anesthesia clinic.

The routine pre-operative tests such as ECG, chest x-ray, CBC, Hb, HCT, FBS, BUN, PT, PTT and urine analysis are obtained for all patients and cardiac consultation is performed for all patients over 40 years of age. Any abnormality in the above mentioned tests leads to canceling the operation, additional requested tests or consultations in order to optimize the patient's condition for anesthesia and surgery. These items are all time consuming and will waste the time of operating room staff, physicians and patients and can lead to severe problems through this triangle correlation. Moreover, it can cause false positive result which misleads the physicians and increases the peri-operative risk in the patients.

Fischer indicates the necessity of the "Anesthesia Clinic" and evaluation of patients in the educational and clinical centers (7).

Starsnic and colleagues count on the anesthesia clinic as a center for upgrading medical cares, satisfying patients and surgeons, saving the time of patients and operating room staff as well as reducing the peri-operative costs (8).

In a study conducted in the year 2004, researchers found that patients whom had been visited in anesthesia clinic showed significantly less anxiety before surgery than those who had been visited only the night before the surgery ( $P < 0.01$ ) (9).

On the other hand, there is a controversial study in this regard which indicates the increased rate of para-clinical procedures for patients in anesthesia clinic. As it is mentioned by the authors of this article, these unexpected results are due to non-standard evaluation techniques and faults in history taking and physical

examinations in the anesthesia clinic. In addition to the above mentioned results, the peri-operative costs were less comparing to the ones before establishing the clinic (10).

Minai and colleagues showed that the cardiac consultations have non-significant efficacy on anesthesia management (11).

Nowadays, there are anesthesia clinics in the most popular medical centers of the world and the patients will be evaluated there pre-operatively to optimize the patients' condition before surgery.

Finally, it seems that the anesthesia clinic is essential and cost-effective and prevents extra expenses and time consuming and unnecessary para-clinical procedures. These tests will be ordered only in those who have indications for it. The patients would be scheduled for operation after optimizing the patients' condition to prevent unnecessary admission, reduce bed-occupying period, and rate of postponed surgeries. It will save the effective time of physicians and hospital personnel and reduce mortality and morbidity rates.

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