DETECTION OF FLUID ABSORBTION DURING TRANSURETHRAL RESECTION OF PROSTATE (TURP)

Mazhar Khan

Department of Surgery,
Khyber Teaching Hospital, Peshawar.

ABSTRACT

Objectives: The aim of this study is to find out the efficacy of alcometernin early diagnosis of fluid absorption during TURP.

Material and Methods: The study involves monitoring of ethanol level in end expiratory breath with the help of Alcometer for early detection of irrigation fluid absorption during transurethral resection of prostate. The results so obtained were compared with simultaneous change in serum sodium level and any change in clinical feature related to fluid absorption. The irrigant used during surgery was 1.5% glycine with 1% ethanol added to it.

Results: The result confirmed that the ethanol breath test is a reliable method of early detection of fluid absorption during TURP. The extent of fluid absorption detected by alcometer correlate well with drop in serum sodium level due to haemodilution. These changes were more pronounced when the duration of resection exceeds 30 minutes.

Conclusion: The alcometer provides as reliable and quick method of detecting water absorption during TURP to give an early warning to the anesthetist of transurethral syndrome.

Key words: TURP syndromes, Alcometer.

INTRODUCTION

Transurethal Resection of Prostate is one of the commonest urological procedure. It is also a gold standard for judging new modes of treatment for enlarge prostate. The mortality rate of this procedure has gradually declined from 5% in 1940 to 1.2% in 1989[1] but morbidity rate remains around 18% since

1960. Among the complication is increase fluid absorption which may lead to a complex condition called TURP syndrome.[2,3,4,5] It is therefore important to device a system to give an early warning about fluid absorption. The aim of this study was to find out the efficacy of alcometer in early diagnosis of fluid absorption during TURP.

MATERIAL AND METHODS

The study was performed on 50 patients under going TURP between the age of 50–75 yrs. The exclusion criteria was those having history of cardiac disease, resection time less then 30 minutes, or weight of resected prostate less then 20gms. All patients had general anesthesia and during operation received 1 liter normal saline intravenously. The irrigating fluid used during operation was 1.5% Glycine with 1% ethanol, supplied in 3 liters collapsible bag, suspended at 60cm from operation table. The operation was carried out with Olympus 27 Fr irrigating resectoscope with continuous suction applied to out flow. All pts had urethrotomy with the help of OTIS- Urethrotome up to 30 Fr. Serum sodium concentrations were monitored by draining 6ml blood samples via 18G IV cannula, and then dividing them into two. One was sent to laboratory for detection with the help of flame photometry, while the other half of the sample was transferred into heparinized syringe, to be analyzed via blood gas machine (ion selective electrode electrolyte analyzer). This was done to compare and cross check the result of each other. Blood samples were collected before induction of anesthesia, at 30 minutes during operation and finally at 60 minutes, or before the conclusion of operation. At the time of each blood collection the end expiratory ethanol concentration was measured via alcometer. Post operatively all patients were drained via 22 Fr 3 way urethral catheter and bladder

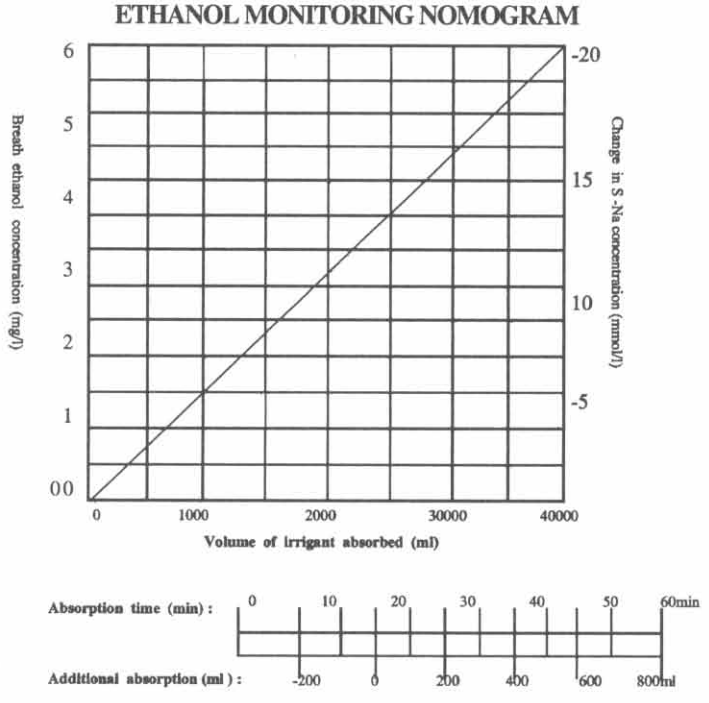

TABLE – 1

irrigated with 0.9% saline for 24 hrs. During operation note was made of any capsular perforation. The patients were monitored for any clinical evidence of excessive fluid absorption i.e. pulse , blood pressure , ECG, O2 saturation and recovery from anesthesia. The amount of fluid absorption in reference to ethanol concentration via alcometer reading was estimated from the following nomogram. (Table 1). The value so obtained is then corrected for duration of operation by the scale provided

Estimate fluid absorption "means error 200ml".

1. Use upper nomogram
2. Add the effect of distribution & elimination of ethanol by using the scale.

Estimate the change in serum sodium "means error 2 mmol/l"

Use upper nomogram directly.

RESULTS

The result obtained by alcometer (table 2) correlate with the laboratory evidence of hyponatremia secondary to fluid absorption during TURP. The result also showed that the amount of fluid absorption is proportional to the length of operation and weight of resection. In this study only one patient who absorbed <2liter of fluid developed clinical sign of overload i.e. bradycardia, hypertension, confusion etc.

DISCUSSION

Till present there is no routine method used for detection of fluid absorption during transurethral resection of prostate,[6,7,8,9] despite well recognized early and late complications arising from this phenomenon. The population at risk are frail old patients who are less tolerant to such complications. Some degree of fluid absorption occurs in every transurethral resection of prostate. The fluid absorption depends upon the pressure with in the prostate cavity[10] and is influenced by the length of operation , the size of resected prostate, presence of capsular tear and the extent of bleeding during resection.[11]

The fluid absorption occurs via both intravascular (valve less intra prostatic veins that are open during resection) and extravascular route,[12,13,14] (infiltration via peri prostatic space) which leads to heamodilution,[13] hypoosmolarity[2] and hyponatraemia.[15,16] Some of the feature of this condition result from the metabolites derived from Glycine.[17,18,19,20,21] Mean amount of fluid absorption is reported to be 1 liter, while the maximum amount may reach as high as 4 liters.[27] Absorption usually begins midway through resection[22] and once started it is very unlikely to stop. It is suggested that to prevent massive fluid absorption the operating time should be limited to 60 minutes[11] and the height of irrigation fluid bag not more then 60 cm from operation table. The evidence is arising that apart from immediate peri and post operative complica-

No : of patients	Alcometer (fluid absor)	Average drop of Na + at 30 min.	Average drop of Na + at 60 min.	Ave : Wt: of Resection (G)
38	< 1 L	2.3 mEq/L	3.6 mEq/L	23gms
10	1-2 L	3.2 mEq/L	5.4 mEq/L	45gms
02	> 2 L	3.5 mEq/L	10 mEq/L	55gms

TABLE – 2

tions, the fluid absorption may lead to delayed cardiac complications.[23,24] Alcometer provides a reliable and non-invasive method of quick indication of absorption of irrigating fluid during TURP.[25,26,13,6] The pattern of ethanol concentration in expired air makes it possible to distinguish between the essentially intravascular or extravascular type of absorption . In case of intravascular absorption the ethnol concentration decreases with in 5 minutes of stopping irrigation, while in extrvascular absorption the ethanol level remains stable or even rises after the bladder irrigation is stopped.[9] Studies have confirmed that the reliability is not effected by chronic obstructive pulmonary disease, which is common in elderly patients undergoing TURP.

Unlike alcometer which is light weight, cheap, pocket size apparatus which is easy to use, the other modalities used for detecting fluid absorption are much more cumbersome and expensive. Following are few examples i.e. labeling fluid with radioisotope, volumatic fluid balance by keeping an accurate record inflow and outflow, or use of impedence cardiography[28] to estimate thoracic fluid over load due to decrease in plasmaoncotic pressure from absorption of hypotonic glycine.

CONCLUSION

Alcometer provide a quick, reliable, non-invasive, cheap and safe method of detecting excessive fluid absorption during TURP It give a good early warning to anesthetist about the situation before the classic clinical sign and symptoms develops, specially in patient under general anesthesia.

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Address for Correspondence:
Dr Mazhar Khan,
Department of Surgery,
Khyber Teaching Hospital,
Peshawar.