

COMPARATIVE ANALYSIS OF PROSTATE SPECIFIC ANTIGEN AND PROSTATIC ACID PHOSPHATASE LEVELS IN SORBITOL MANNITOL SOLUTION AND DISTILLED WATER USED TRANSURETHRAL PROSTATECTOMIES

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SUMMARY : *In this study we determined postoperative first day serum Prostate Specific Antigen (PSA) and Prostatic acid Phosphatase (PAP) levels in patients with benign prostatic hyperplasia (BPH) and prostatic carcinoma who had undergone transurethral prostatectomy (TURP) and in whom distilled water or sorbitol mannitol solution had been used for irrigating fluid.*

Our data showed there were no difference between these two irrigating solutions considering their effect on the diffusion of PSA and PAP to the circulation during TUR.

Key Words : *Prostate Specific antigen Prostatic Acid Phosphatase, Sorbitol Mannitol Irrigating Fluid, Distilled Water, Transurethral Prostatectomy.*

INTRODUCTION

Today 80 % of BPH is treated with TURP. This method of treatment complies the endoscopic resection of the hyperplastic adenoma under general or spinal anesthesia. It has been widely used during the last thirty years because of its simplicity and safety both for the surgeon and the patient.

Recently, nonhemolytic solutions are more commonly used during TURP. The majority of these solutions are distilled water, 1.5 % glycine solution, sorbitol mannitol combination and mannitol solution. These solutions except distilled water are nonhemolytic.

For example, the osmolarity of glycine solution is approximately 200 m osm/kg whereas normal serum osmolality is 290 m osm/kg (Harrison et al. 1956). Although these solutions except distilled water do not lead to hemolysis, they can cause TUR

syndrome. Previous investigations showed that, postoperative morbidity and mortality rates were significantly decreased after using sorbitol mannitol irrigation solutions (Emmett et al. 1969). The purpose of this research is to analyse the serum levels of PSA and PAP, comperatively between sorbitol mannitol solution and distilled water during TURP.

MATERIALS AND METHODS

In this study 37 patients with prostatism symptoms who had had BPH or prostate carcinoma and treated with TURP were studied. Mean age was 64.02 years (Range 51-78) (Table 1). Routine blood tests, urinalysis, intravenouspyelography (IVP), ultrasonography (USG) and in necessary cases computed tomography (CT) and scintigraphy were performed prior to the operation. In 2 (5.4 %) patients epidural anesthesia and in 35 (94.6 %) spinal anesthesia were used. During TURP 15 (40.55 %)

Age	Patient no.	%
50-60	12	32.43
60-70	19	51.35
Above 70	6	16.222
Total	37	100.00

Table - 1 : Age distribution of patients.

patients were irrigated with distilled water and 22 (59.45 %) with sorbitol mannitol solution (Table 2). For each patient; operation time (min), resected tissue weight (gr) (Table 3) and irrigation solution amount (ml) were determined (Table 4). Serum samples were taken and PSA, PAP levels were determined in the first postoperative day.

Irrigation	Patient no	%
Distilled Water	15	40.55
Sorbitol Mannitol	22	59.45
Total	37	100.00

Table - 2 : Irrigation solution types used.

Diagnosis	Patient no.	Resected weight(g) (\pm SEM)	Range
BPH	27	16.07 \pm 3.12	(6.10-24)
Prostatic carcinoma	10	14 \pm 142.81	(10-18)

Table - 3 : The resected tissue weights in patients with BPH and prostatic carcinoma.

Irrigation solution amount ml.	Patient no.	%
6000-12000	17	45.94
12000-18000	9	24.32
18000-24000	10	27.02
Above 24000	1	2.72
Total	37	100.00

Table - 4 : Distribution of the patients according to irrigation solution amounts.

Variable	No. of patients	Postoperative first day PSA (ng/ml)	\pm SD	t value	P
1	17	17.22 (2.19-67.01)	\pm 15.85	-6.15	P>0.05 Not significant
2	10	21.14(5.61-54.43)	\pm 16.14		
3	5	101.37(25-185.54)	\pm 60.13	-1.90	P>0.05 Not significant
4	5	96.6(7.87-112.87)	\pm 39.02		

1= Patients with BPH who were irrigated with sorbitol mannitol solution. 2= Patients with BPH who were irrigated with distilled water. 3= Patients with Prostatic carcinoma who were irrigated with sorbitol mannitol solution. 4= Patients with prostatic carcinoma who were irrigated with distilled water.

Table - 5 : Statistical analysis of sorbitol mannitol irrigation fluid and distilled water in patients with BPH and prostatic carcinoma for postoperative first day PSA levels.

Serum PSA assays were performed using the PSA double antibody radioimmunoassay kit (Diagnostic Products Coororation 31 Station Lane Witne, Oxfordshire ox 8 GAN United Kingdom Lot No : KPSDI 0320). The values under 4 ng/ml were accepted normal.

Serum PAP assays were performed using Fishman and Lerner's L Tartarat Inhibition method. The values between 0.1 - 0.8 King Armstrong Unite (KAU) were considered normal. Pathological examination of these specimens were done by the Department of Pathology, Gazi Univercity School of Medicine. Statistical analysis was performed using the t test.

RESULTS

In this study 27 (72.97 %) of 37 patients were histopathologically diagnosed as BPH and the rest 10 (27.03 %) as prostatic carcinoma.

Mean postoperative first day PSA level in BPH group using sorbitol mannitol irrigating fluid was determined as 17.22 ± 15.85 ng/ml. In BPH patient group with distilled water, mean PSA level was found 21.14 ± 16.14 ng/ml. The difference in these two mean PSA levels were found statistically insignificant ($P>0.05$) (Table 5).

In patients with prostatic carcinoma who had been irrigated with sorbitol mannitol solution mean postoperative first day PAP level was found to be 101.37 ± 60.13 ng/ml. In distilled water irrigated patients postoperative first day mean PSA level was 96.6 ± 39.02 ng/ml. The difference in these two mean PSA levels were found statistically insignificant ($P>0.05$) (Table 5).

In patients with BPH who had been irrigated with sorbitol mannitol solution mean postoperative first day serum PAP level was found 1.22 ± 0.71 KAU. Distilled water irrigated patients had $0.82 \pm$

Variable	No. of patients	Postoperative first day PAP (KAU)	± SD	t value	P
1	17	1.22 (0.3-2.6)	±0.71	1.90	P>0.05 Not significant
2	10	0.82(0.1-1.6)	±0.54		
3	5	5.72(3.4-12.8)	±3.97	-0.81	P>0.05 Not significant
4	5	4.54(1.2-6.2)	±2.31		

1= Patients with BPH who were irrigated with sorbitol mannitol solution. 2= Patients with BPH who were irrigated with distilled water. 3= Patients with Prostatic carcinoma who were irrigated with sorbitol mannitol solution. 4= Patients with prostatic carcinoma who were irrigated with distilled water.

Table - 6 : Statistical analysis of sorbitol mannitol irrigation fluid and distilled water in patients with BPH and prostatic carcinoma for postoperative first day PSA levels.

0.54 KAU mean PAP level. The difference between these two values were not statistically significant (P>0.05) (Table 6).

In patients with prostatic carcinoma who had been irrigated with sorbitol mannitol solution mean postoperative first day PAP level was found 5.72 ± 3.91 KAU. Mean postoperative first day PAP level of distilled water irrigated prostatic carcinoma patients was 4.54 ± 2.31 KAU. The difference between these two mean values were statistically insignificant (P>0.05) (Table 6).

PSA-PAP levels did not correlate with operation time, resected tissue weight and irrigation amount.

DISCUSSION

Today sorbitol mannitol solution has replaced other irrigation solutions because of its superior characteristics. Emmett et al (1969) compared sorbitol mannitol solution with distilled water and found that postoperative mortality rates were decreased by sorbitol mannitol solution. Bichler et al. (1985) reported that using sorbitol mannitol irrigation solution the incidence of hemolysis was decreased significantly. Alfred et al. (1983) provided that sorbitol mannitol solutions have less coagulative effect than the others.

In our study we have reached to the same conclusion that no major complication such as hemolysis and TUR syndrome is encountered using sorbitol mannitol solution.

We have been unable to find a study with similar design that investigates the effect of irrigation solution on PSA and PAP levels. We may conclude that the type of irrigation solutions has no significant effect on secretion of PSA - PAP molecules to the circulation.

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