

THE EFFECT OF IRRIGATING FLUID ABSORPTION ON MYOCARDIAL DAMAGE IN TURP

Hypothesis / aims of study

TURP(transurethral resection of prostate) is a standard surgical treatment for BPH. Myocardial damage is the most serious complication and has been postulated to develop as a result of irrigating fluid absorption during TURP. If it occurs, it may be due to the volume of fluid absorbed together with prostatic tissue material released from the operating site. The cardiac toxic effect have been thought from low osmolality and the activity of prostatic acid phosphatase[1]. However it is not known well how much fluid absorption can cause cardiac damage. Traditionally diagnosed myocardial infarction based on clinical symptoms, ECG and cardiac enzymes would be equivalent to cardiac troponin I greater than 2 μ g/L. The ECG ST-segment change usually can be detectable after postoperative one day. This cardiac events may be masked during surgery or in the postoperative period without clinical symptoms or signs, making detection difficult. Cardiac Troponin I is released into the blood-stream within hours of any ischemic damage and elevated cardiac troponin I is detectable in serum within 4-6 hours, elevated for 3 to 10 days. The expected cardiac troponin I concentration in healthy individuals is 0.5 μ g/L or less at the 95th percentile[2]. Therefore, we can expect that cardiac damage occurs if serum cardiac troponin I is greater than 0.4 μ g/L within 4-6 hours after TURP. This study is to evaluate the relationship between the amount of irrigating fluid absorption and myocardial damage using cardiac troponin I, and the factors that affect irrigating fluid absorption.

Study design, materials and methods

Fifty two patients who had undergone TURP were evaluated. TURP was performed under the epidural anesthesia and URIONE solution(Sorbitol 2.7mg + Mannitol 0.54mg/100ml distilled water) was used as the irrigating fluid. The amount of absorbed irrigating fluid was calculated by preoperative and postoperative serum sodium concentration using the following equation: Absorbed irrigating vol.(L) = [preop. Na/postop. Na x Body Weight(Kg) – 1] x 0.2. At 6 hours after TURP serum troponin I was checked as a marker of perioperative myocardial damage. We decided that the patient whose postoperative serum troponin I was greater than 0.4 μ g/L had myocardial damage. Resection time, weight of resected prostatic tissue, and the amount of blood loss were evaluated as the factors that affect the irrigating fluid absorption. The blood loss was calculated by measuring the hemoglobin amount containing in irrigating fluid by colorimetric method using the following equation: Blood loss(ml) = 100 x [Hb in solution(mg/dl) x irrigating solution vol.(dl)/preop. serum Hb(g/dl)].

Results

The mean age of patients was 68.45yrs(58-95yrs). The mean operation time was 34 min.(25-50 min.). The mean weight of resected prostate tissue was 15.76g(8-275g). Two patients(3.8%) were decided to have myocardial damage postoperatively, whose volume of irrigating fluid absorption being more than 1000ml.

Interpretation of results

Blood loss($r=0.339$, $p=0.01$) and. weight of resected prostate tissue($r=0.566$, $p=0.001$) were found to have moderate correlation with the amount of absorbed irrigating fluid(Fig. 1, 2). However, the amount of irrigating fluid($r=0.293$, $p=0.11$) and resected time($r=0.296$, $p=0.062$) had no correlation with the amount of absorbed irrigating fluid.

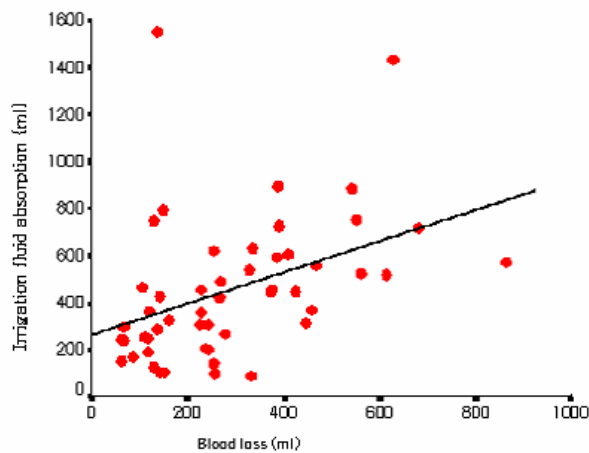


Fig. 1. Scatter diagram shows correlations between irrigation fluid absorption volume and blood loss ($r=0.339$, $p=0.01$)

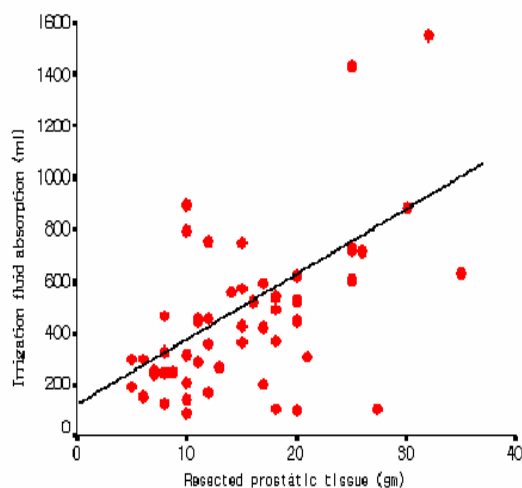


Fig. 2. Scatter diagram shows correlations between irrigation fluid absorption volume and weight of resected prostatic tissue ($r=0.566$, $p=0.001$).

Concluding message

Therefore in case of large sized prostate and excessive blood loss it is recommended to use diuretics during TURP to reduce the incidence of myocardial damage.

References

1. Zhang W, Andersson BS, Hahn RG. Effect of irrigating fluids and prostate tissue extracts on isolated cardiomyocytes. *Urology*,46:821-824,1995
2. Inman RD, Hussain Z, Elves AW, Hallworth MJ, Jones PW, Coppinger SW, A comparison of 1.5% glycine and 2.7% sorbitol-0.5% mannitol irrigants during transurethral prostate resectio. *J. Urol.*, 166:2216-2220, 2001.