THE LEARNING CURVE IN TRANSURETHRAL RESECTION OF PROSTATE (TURP) - THE EXPERIENCE OF EIGHT YOUNG UROLOGISTS DURING A SIX-YEARS PERIOD

Alin Adrian Cumpanas, Mircea Botoca, Viorel Bucuras, Dorin Claici, Petru Boiborean, Florin Miclea, Petru Dragan

INTRODUCTION AND OBJECTIVES

It is credited that the first transurethral operation to relieve bladder outlet obstruction has been performed by Ambroise Pare (in the 16-th century) who used a curette and a sharpened hollow sound to shear off urethral strictures.1

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MATHERIAL AND METHODS

In this study we retrospectively analyzed 536 TURP procedures performed by eight young urologists, from their first procedures, during a six years period. All procedures have been performed in the same conditions, using Ch24 or Ch28 continuous flow (Iglesias type) Storz resectoscopes (Karl Storz Endoskope, Tuttlingen, Germany) with sterile water as irrigating fluid. TURP procedures were performed under spinal anesthesia (98.5%) and, rarely, using epidural anesthesia (1.5%).

The charts and surgical report files of all the above mentioned cases were analyzed focusing on the following aspects: age, estimated prostate volume (by suprapubic ultrasound), weight of resected tissue, resection time, intraoperative complications, postoperative complications, re-do TURP, length of hospitalization.

The suprapubic ultrasound is considered in the literature as the routine procedure to assess the prostate volume and the values obtained can be considered reliable since all the eight urologists have had at least 2 years of previous experience in this type of examination. To assess the weight of resected tissue, weighting of resected tissue is mandatory.

As the number of procedures per year significantly differs and from the practical point of view it is important to evaluate the tendency of results and complications during the training period, we considered that the most appropriate way is to directly compare the results (in percents) for each item.

RESULTS

The number of procedures during the six years period increased from 25 (1-st year) to 200 (6-th year), as follows: 38 cases (2-nd year), 39 cases (3-rd year), 79 cases (4-th year) and 155 cases in the 5-th year.

The mean age of the patients ranged between 67.4 and 69.1 years.

Using suprapubic ultrasound examination, the estimated prostate volume increased from 30.8 cm3 (in the first year) to 41.7 years (in the sixth year). (Figure 1)

The mean weight of resected tissue (in grams) increased from 20.3 grams (1-st year) to 29.6 grams (6-th year) as is shown in Figure 2.

The mean time of resection slowly decreased from 51 minutes (1-st year) to 40 minutes (the sixth year), as follows: 54 min (year 2), 51 min (year 3), 51 min (year 4) and 49 min (year 5). It is obvious that this happened in conjunction with increasing of the weight of resected tissue as shown above, thus, a steadily increase in the speed of resection (from 0.4 grams per minute in the first year to 0.74 grams per minute in the sixth year) were noted, as results in Figure 3.
DISCUSSIONS

It is widely accepted that for TURP, spinal anesthesia is a safe and effective alternative, which offers enough comfort both to surgeons and patient.\(^1\) For the patients with a poor health status, epidural anesthesia should be considered as an alternative.\(^4\) TURP under local anesthesia has been reported in 1977 by Mc Gowan and Smith\(^3\) and thereafter by Birch et.al \(^5\) who presented a series of 100 men who underwent TURP under local anesthesia supplemented with intravenous sedation. They did not found any differences between regional and local anesthesia in terms of blood loss, complications and perioperative mortality, but the average weight of resected tissue was lower in local anesthesia group (11 grams) compared with regional anesthesia group (22 grams).

We do not have experience with the use of local anesthesia but it can be presumed that the current climate of health care economics will encourage physicians to seek alternative ways to reduce costs of surgical procedures, including the use of local anesthesia and other measures.\(^6\)

The problem, which is of paramount importance in TURP, is the technique of resection that is undoubtedly correlated with intraoperative and postoperative complications. Various techniques have been developed for systematic removal of the adenomatous tissue. All of these are based on the principle of step-by-step resection, as initially described by Nesbit\(^1\) and modified by Mauermayer and Green.\(^7,8\) As bleeding is the resectionist’s nemesis, leading to loss of visual field and disorientation, it is imperative that resection and hemostasis should both be completed in one area of the fossa before the next area is tackled. As it results from the literature, lesser bleeding leads to lesser intraoperative complications and fewer postoperative complications.\(^9,10\) This fact can be seen in our results too. However, it is obvious that experience leads to better technique, better hemostasis and, by consequence reduces both intra- and postoperative bleeding.

Other aspect is related to the impact of experience in weight of resected tissue. Larger prostates (50-60 grams) are preferred for resection by the beginners due to low risk of intraoperative complications but the risk of postoperative complications and acute urinary retention after catheter removal is higher.\(^9\) Our data suggests that it has been started with small prostates which leads to better postoperative results with low rates of postoperative complications and re-do TURP rates, despite they are quite difficult to be resected. The “price” for choosing smaller prostates for the beginning is the low speed of resection (the weight/time ra-
tio), which was on first two years of resection lower than 50% of so-called “optimum speed of resection” which is considered 1 gram per minute. In spite of this, the incidence of TUR syndrome among first 500 cases was comparable with the average TUR syndrome incidence in large series.\(^9,10\) We can presume that this fact is due to the incomplete resection. This does not open larger vessels located beneath the prostate capsule, thus the irrigation fluid resorbtion is not significant. It is accepted that the average resorbtion rate during TUR procedures are between 10 and 30 ml per minute.\(^10\)

By gaining experience, the resection tends to be complete, the larger vessels are opened and, on the other hand (despite the higher speed of resection) the time of procedure can increase by operating larger prostates, thus, the risk of facing with TUR syndrome is higher.

The technique used by the eight young urologists is that commonly used in our department which consists in creating a tunnel on the floor of prostate, followed by the resection of one lobe and thereafter the second lobe (Nesbit technique modified by Mauermayer). Rarerly we have to choose another technique, including “the English channel”.

We have to mention that all urologists from our department learned the technique of resection from three mentors (Assoc. Prof. Boiborean, Prof. Miclea and Prof. Dragan), which started the resection in the 80’s, gaining a very large experience. Their experience led to the changed attitude in the management of large prostate adenoma (over 60-80 grams) which steadily became a TURP-resort issue, having results comparable with TUR on smaller prostates. This fact represented a priority and the results were appreciated when communicated on Central European Congress of Urology, Vienna (1999).\(^{11}\) Being trained with this attitude, all the young urologists are trying to improve the quality of the resection and, by this, to be able to resect larger prostates. Another aspect that has to be mentioned is that in our department Ottis urethrotomy prior TURP is widely used in order to prevent urethral strictures post-TURP, by an adequate calibration of the urethra.\(^{12}\)

The length of postoperative hospitalization is directly related with the length of postoperative evolution, complications and at least but not last, with the operator’s experience: the tendency is to maintain the catheter a little bit more than necessary (on the beginners) with an earlier catheter removal after gaining experience. There are authors which suggest that an early catheter removal (extremely careful hemostasis, bladder irrigation postoperatively plus furosemide, catheter removal in day 1 postoperatively and discharge of the patient after 2-3 micturitions in the same day) could be a safe attitude, without significant additional complications.\(^{13-15}\)

Postoperative infectious complications (e.g. acute pyelonephritis, epididymitis etc) did not significantly change during the six-year period, revealing that are not experience-related.

The rate of re-do TURP, as mentioned before, constantly decreased from 8% to 3.5% as a consequence of gaining experience, with better resection which tends to be complete, as results from the weight of resected tissue/estimated prostate volume ratio which increased from 0.65 to 0.70.

Most authors suggest that a mean number of 40-50 procedures for each urologist are the minimum to achieve satisfactory skills on TURP.\(^7,9\) Indeed, after a mean number of 320 procedures (in the fifth year) which means 40 procedures per each urologist, the incidence of intraoperative and postoperative complications are comparable with those from large, multicentric, randomized studies.\(^9,10,13,16,17\)

**CONCLUSIONS**

Learning curve in TURP is steep, with a wide range of intra- and postoperative complications. The incidence of these complications is not very high but some of them, like TUR syndrome, unrecognized, can be life threatening. Larger experience leads to better results.

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