Poster No.: **914**

Experiences of urodynamic studies of the upper urinary tract:
The importance of hydrostatic intrapelvic pressure measurement in the urological praxis

Sándor Lovász, Péter Tenke

Jahn Ferenc Dél-Pesti Hospital, Dept. of Urology, Budapest, Hungary

Introduction & Objectives

Based on results of 300 urodynamic studies of the upper urinary tract having been performed within the last 6 years, we sought for an easy-to-use method letting us quantitively measure degree of post renal obstruction thus securely define optimal time of nephrostomy tube removal.

Material & Methods

We performed more than 300 pressure-flow studies of the upper urinay tract within the last 6 years using the **constant presure-flow study** (Navarrete principle) (figure 1).

In order to evaluate pressure-flow relation in a wide pressure range, we performed dynamic studies using **stepwise rising filling pressure** (figure 2).

The evaluation of these multistep pressure-flow studies proved a clear **parabolic correlation** described by the formula **$Y=AX^2+B$**. Coefficient A defines the shape of the curve thus quantitatively measures degree of obstruction (**obstruction coefficient – OC**) (figure 3).

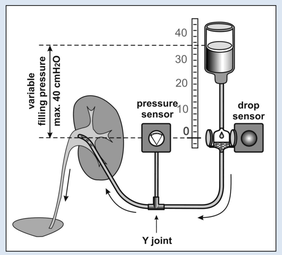

Figure 1

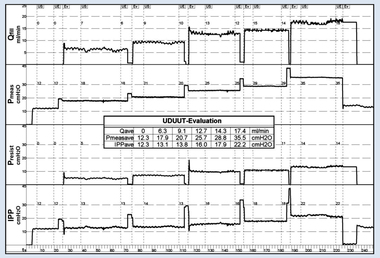

Figure 2

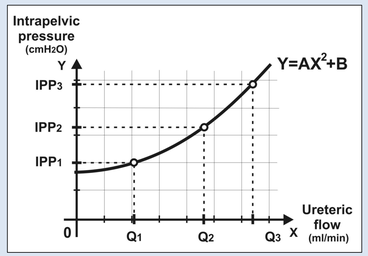

Figure 3

We used a newly developed, PC based evaluation software for quick and easy calculation of obstruction coefficient (figure 4).

We measured **resting (spontaneous) intrapelvic pressure (SIPP)** in prone position by using the method of hydrostatic pressure measurement through preexisting nephrostomy tubes (figure 5).

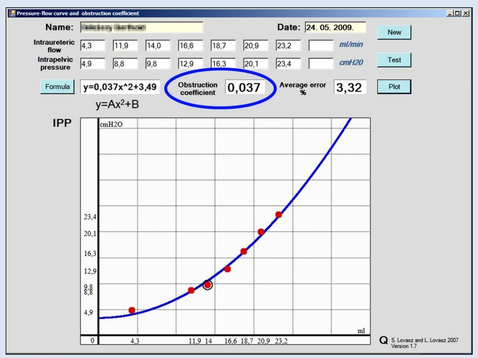

Figure 4

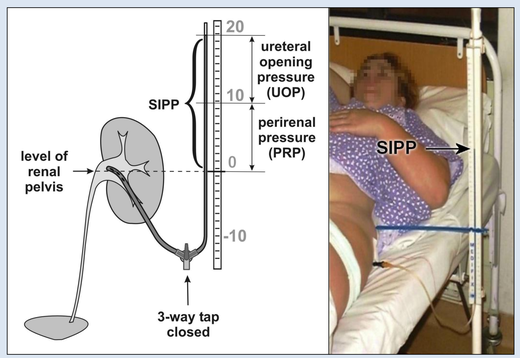

Figure 5

Ureteral opening pressure (UOP) can be calculated by subtracting the **perirenal pressure (PRP)** from the hydrostatically measured SIPP value.

Results

We found that the intrapelvic pressure measured at zero external filling, the **ureteric opening pressure (UOP)** correlates with degree of obstruction, with obstruction coefficient (figure 6).

Statistical analysis of triple comparison of Whitaker-test (WT), ureteral opening pressure (UOP) and obstruction coefficient (OC) in 116 patients of a prospective study proved a strong correlation all among them, therefore any of these could equally be used for estimation of degree of obstruction (figure 7).

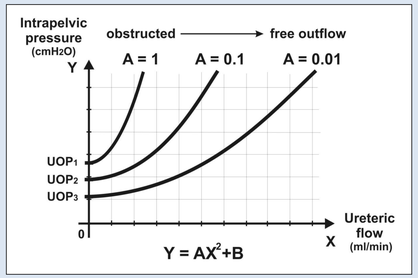

Figure 6

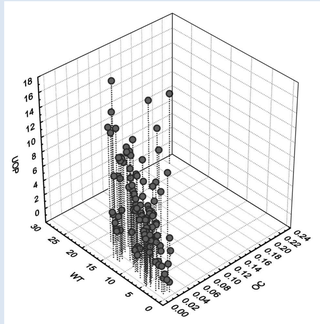

Figure 7

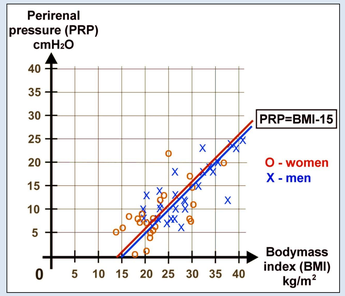

Figure 8

In order to estimate perirenal pressure as a new reference pressure we compared body mass index (BMI) and intrapelvic pressure in 46 patients in a prospective study. Perirenal pressure (PRP) was found to be the best applicable reference pressure, which can be approximately calculated by using the formula: **PRP = BMI-15** (figure 8).

Conclusions

- Spontaneous intrapelvic pressure (SIPP) can easily and exactly be measured by the **simple hydrostatic pressure measurement** performed through an existing nephrostomy catheter.
- This is basically the simpliest pressure flow study: **intrinsic filling by the diuresis**. Dynamic balance at the SIPP: produced urine = ureteric transport.
- SIPP consists of two compounds: 1. Perirenal pressure (PRP) 2. Ureteric opening pressure (UOP)
  1. **PRP** can be estimated by using simple formula: **PRP = BMI-15**
  2. **UOP** – corresponding real intrapelvic pressure, defines degree of post renal obstruction quantitatively. Its normal level is **less than 5cmH_2O**.
- Using hydrostatic pressure measurement there is **no need of urodynamic skill or any expensive equipment.**
- It solves the dilemma of finding **optimal time of nephrostomy removal**.
- **Simple blocking of nephrostomy catheter** (as routinely used in the past) is a dangerous, out-of-date method, which – being in possession of hydrostatic pressure measurement - **cannot be justified any more!**

26th Annual EAU Congress, Vienna 18-22th March 2011.