

Examination of kidney concentration

Impaired renal impairment is one of the first signs of renal disease. We proceed with its investigation as follows:

- We first examine the osmolality in the morning urine sample. A healthy person should produce urine with an osmolality of about 600 mmol / kg after taking fluids at night. This value indicates good renal concentration and, if achieved, we do not proceed with further investigation.
- The adiuretin test reflects the ability of the distal tubule and collecting duct to respond to adiuretin (vasopressin) by producing concentrated urine. The patient is administered 10 µg (2 drops) of 1-deamino-8-D-arginine vasopressin (DDAV), which is a synthetic analogue of adiuretin, to each nostril after nocturnal withdrawal. It is characterized by an enhanced antidiuretic effect, while other pharmacological effects are suppressed. The patient collects urine at four one-hour intervals and the osmolality of individual urine samples is measured. If it exceeds the value given in the table, this indicates good renal concentration and we will terminate the experiment. At the same time as the urine, blood is collected and the serum osmolality is examined. From the values of osmolality in urine and serum, we calculate the osmotic index (U_{osm} / S_{osm}), which more accurately reflects the concentration capacity of the kidneys.

Physiological values of urine
osmolality and osmotic index after
adiuretin administration

Age	$U_{mmol/kg\ H_2O}$	U_{osm}/S_{osm}
15-20	970	3,34
21-50	940	3,24
51-60	830	2,86
61-70	790	2,72
71-80	780	2,69

Another possibility is to evaluate urine osmolality under conditions of varying lengths of fluid withdrawal, which are currently rarely performed.

The concentration ability of the kidneys is impaired mainly in diseases affecting the renal tubules and interstitium, where the countercurrent concentration gradient is disturbed.

It is also possible to examine the dilution capacity of the kidneys after exposure to distilled water. The test reflects the ability to produce urine whose osmolality is significantly lower than the osmolality of the serum.

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