

Hendrik Borgmann

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## 5.1 Definition

Polyuria is defined as an excessive excretion of urine in a 24-h period. Definitions vary but a urine output of more than 3 l in 24 h in adults is usually considered as polyuria. A more accurate method – especially for children – is to calculate the amount of urine in relation to body weight. Polyuria is then defined as a urine output of more than 30 ml/kg body weight/24 h. It must be differentiated from the more common complaints of frequency or nocturia, which are not associated with an increase in the total urine output.

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## 5.2 Medical History

The history of the present illness should cover questions on the amounts of fluid consumed and voided to distinguish between polyuria and urinary frequency. The patient should be asked about the duration of the problem, the rate of onset (abrupt vs gradual), and variations of onset during the day and during the week. Explicit questions should cover recent clinical features potentially causing polyuria like metabolic and endocrinologic disorders, IV fluids, tube feeding, resolution of urinary obstruction, recent surgery, stroke, or head trauma. A review of systems should search for symptoms suggesting causes like dry eye or dry mouth (Sjogren's syndrome) and B symptoms (cancer). Past medical history should focus on conditions associated with polyuria like diabetes mellitus, sarcoidosis, amyloidosis, and hyperparathyroidism. Drug history should look for drugs increasing urine output like

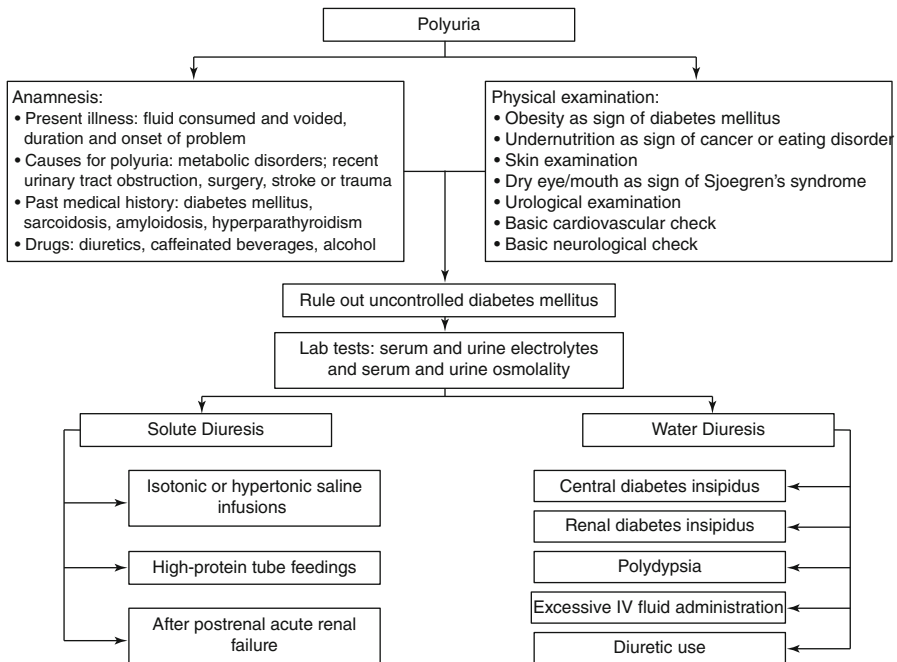
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diuretics, caffeinated beverages, and alcohol as well as drugs associated with nephrogenic diabetes insipidus like cidofovir, foscarnet, and lithium. Red flags signaling severe diseases are abrupt onset of polyuria or onset during the first years of life, B symptoms in combination with a smoking history and psychiatric disorders.

### 5.3 Diagnostics

The diagnostic workup should start with a physical examination noticing signs of obesity as a risk factor for type 2 diabetes mellitus or undernutrition reflecting underlying cancer or eating disorder with diuretic use. Skin examination should focus on hyper- or hypopigmentations, ulcers, or subcutaneous nodules that may suggest sarcoidosis. Urological disorders should be excluded as well by physical examination and ultrasound. The first step of laboratory investigations should rule out uncontrolled diabetes mellitus by serum or fingerstick glucose determination. Further laboratory investigations include serum and urine electrolytes and serum and urine osmolality. A urine osmolality of  $>300$  mOsm/kg is usually associated with solute diuresis and a urine osmolality of  $<300$  mOsm/kg with water diuresis. Further investigations include (enhanced) water deprivation tests and measurement of plasma ADH to distinguish between different conditions causing water diuresis. The flow chart (Fig. 5.1) demonstrates the pathway from symptoms to diagnosis.



**Fig. 5.1** Flow chart demonstrating the pathway from the symptom polyuria to the final diagnosis

## 5.4 Differential Diagnosis

Reasons for polyuria

Differential diagnosis	Incidence	Diagnostics
Diabetes mellitus	++++	Glucose, oral tolerance test
Isotonic or hypertonic saline infusions	+++	Stopping or slowing rate of administration
High-protein tube feedings	++	Switching to feedings with lower protein content
After acute renal failure	+	Clinical evaluation
Central diabetes insipidus	+	Laboratory and water deprivation test, imaging
Renal diabetes insipidus	+	Laboratory and water deprivation test
Polydipsia	++	Laboratory and water deprivation test
Excessive IV fluid administration	+++	Stopping or slowing rate of administration
Diuretic use	+++	Clinical evaluation