Classification of Urolithiasis in Denmark—a national survey

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Background:

To describe the distribution of stone diseases in Denmark, using a simple classification system based on etiology and risk factors.

Design, metods and material:

All urological departments in Denmark were invited to join a central registration of all adult patients with upper urinary tract stones for a 2-year period. Seventeen departments participated (90%). Patients were evaluated according to the guidelines from the Scandinavian Cooperative Group for Urinary Stones (1).

Both hospitalized and out-patients were included.
Patients could only be registered once.

Patients were evaluated and classified according to the guidelines *(fig. 1 and table 1-2).*

MIAF urolithiasis: conditions with a definitive Metabolic, Infectious, Anatomical or Functional cause of stone formation.

Seventeen departments representing 11 of 14 counties participated, covering approximately 90 % of the population.

Number of patients/department: median 81 (range: 19 - 429).

2294 patients were registered.
57.4 % were new stone formers.

Classification:

Simple idiopathic calcium urolithiasis

Complicated idiopathic calcium urolithiasis:
- With hypercalciuria
- With hypocitraturia
- With both hypercalciuria and hypocitraturia
- With neither hypercalciuria nor hypocitraturia
- With unknown urine calcium and urine citrate

MIAF urolithiasis:

- Metabolic
  - Uric acid related disorders
    - Uric acid stone with hyperuricaemia
    - Uric acid stone without hyperuricaemia
    - 2.8 hydroxyadenuria
    - Xanthinuria
  - Hyperoxaluric states
    - Primary hyperoxaluria
    - Enteric hyperoxaluria
  - Hypercalcaemic states
    - Primary hyperparathyroidism
    - Other hypercalcaemic conditions
  - Renal tubular acidosis
  - Chronic diarrhoeal states
  - Cystinuria
  - Other rare causes not mentioned above (ex. Indinavir)
- Infection stones
- Anatomical or Functional abnormalities

Classification not possible (incomplete diagnostics)

Table 1. Classification.

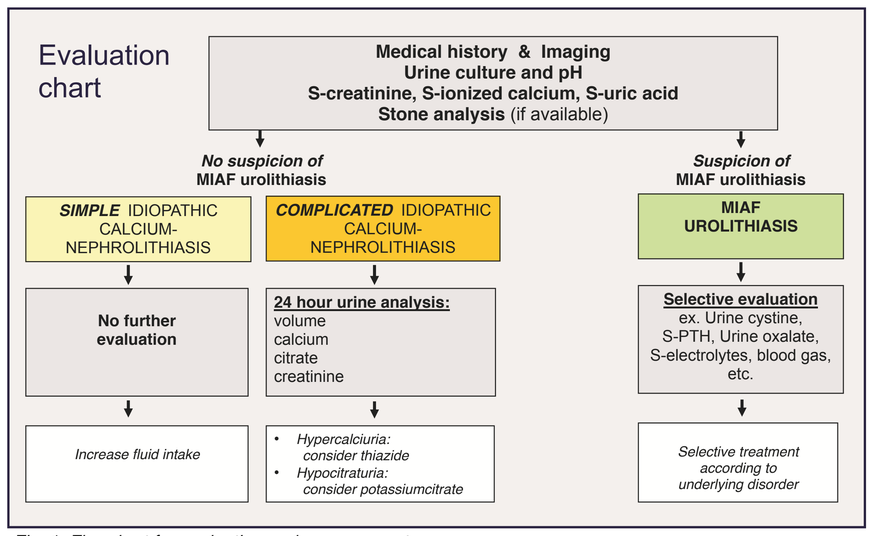

Fig. 1. Flowchart for evaluation and management.

Definition of simple and complicated stone disease

Simple stone disease:
- Single stone former with spontaneous passage of stone.
- Unilateral typical radiopaque stone that is easily fragmented and cleared from the renal tract following ESWL and/or endoscopical surgery.
- Insignificant recurrence of typical radiopaque stone.

Complicated stone disease:
- Suspicion of MIAF urolithiasis.
- Significant recurrence.
- High stone burden.
- Early stone debut (<20 years).

Table 2. Definition of simple and complicated stone disease.

Results:

2294 patients were registered.

Relative distribution

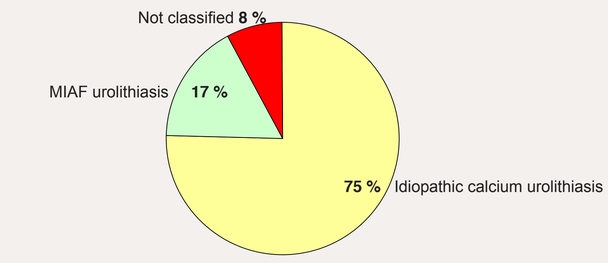

Fig. 2. Distribution of MIAF and idiopathic calcium urolithiasis.

Relative distribution

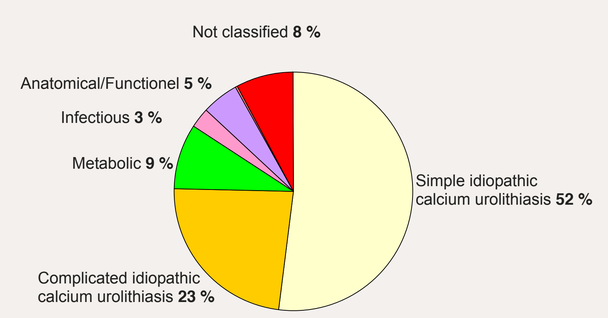

Fig. 3. Distribution of MIAF and idiopathic calcium urolithiasis.

Overall results (number of patients and distribution) (N=2294):

		Classification	Number	%
Idiopathic calcium urolithiasis (n=1543)	**Simple** (n=1190)	Simple idiopathic calcium urolithiasis	1190	51.9
	Complicated (n=534)	Complicated idiopathic calcium urolithiasis with hypercalciuria	48	2.1
		Complicated idiopathic calcium urolithiasis with hypocitraturia	155	6.8
		Complicated idiopathic calcium urolithiasis with both hypercalciuria and hypocitraturia	19	0.8
		Complicated idiopathic calcium urolithiasis with neither hypercalciuria nor hypocitraturia	117	5.1
		Complicated idiopathic calcium urolithiasis with unknown urine calcium and urine citrate	195	8.5
MIAF (n=389)	**Metabolic** (n=214)	Uric acid stone with hyperuricaemia	58	2.5
		Uric acid stone without hyperuricaemia	42	1.8
		2.8 hydroxyadenuria	0	-
		Xanthinuria	0	-
		Primary hyperoxaluria	6	0.2
		Enteric hyperoxaluria	22	1.0
		Primary hyperparathyroidism	29	1.3
		Other hypercalcaemic conditions	11	0.5
		Renal tubular acidosis	4	0.1
		Chronic diarrhoeal states	10	0.4
		Cystinuria	27	1.2
		Other rare causes not mentioned above (ex. Indinavir)	5	0.2
	Infectious (n=63)	Infection stones	63	2.7
	Anatomical/Functional (n=112)	Anatomical or Functional abnormalities	112	4.9
Not classified (n=181)		Classification not possible (incomplete diagnostics)	181	7.9
Total			2294	100

Table 3. Overall number of patients according to classification.

Hypercalciuria and/or hypocitraturia in patients with complicated idiopathic calcium urolithiasis

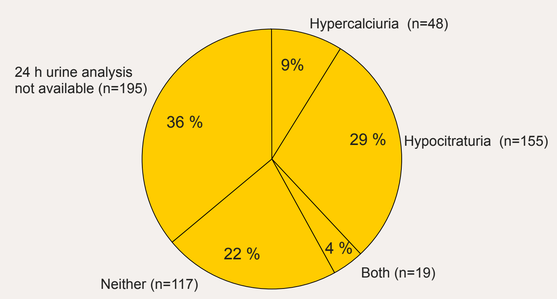

Fig. 4. Presence of hypercalciuria (> 0.1 mmol/kg/24 h) and/or hypocitraturia (< 2 mmol/24 h) in patients with complicated idiopathic calcium urolithiasis (N=534).

Metabolic causes (N=214)

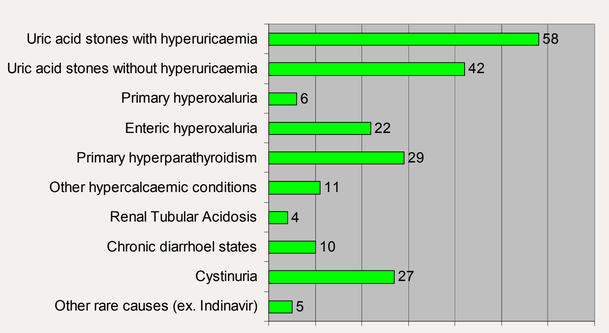

Fig. 5. Number of patients with metabolic causes (N=214).

389 patients (17 %) had MIAF-urolithiasis, 1724 patients (75 %) had idiopathic calcium urolithiasis, and 181 patients (8 %) were not classified *(fig. 2).*

1190 patients (52 %) had simple idiopathic calcium urolithiasis, 534 patients (23 %) had complicated idiopathic calcium urolithiasis, 214 patients (9 %) had a metabolic cause, 63 patients (3 %) had infection stones, and 112 patients (5 %) had an anatomical/functional cause *(fig 3).*

Among 534 patients with complicated idiopathic calcium urolithiasis 48 (9%) had hypercalciuria, 155 (29%) had hypocitraturia, 19 (4%) both hypercalciuria and hypocitraturia and 117 (22%) had neither hypercalciuria nor hypocitraturia. In 195 patients (36%) 24H U-calcium and U-citrate was not available. *(fig. 4).*

214 patients had a metabolic cause *(specified in fig. 5).* The were no cases of 2.8 dihydroxyadenuria or xanthinuria.

Conclusion

The classification system was applicable and of clinical value. The results are supposed to be representative for the whole nation of Denmark.

Ref.: (1) Osther PJ, Grenabo L, Haraldsson G, Holmberg G, Lindell O, Mogensen P, Schultz A, Ulvik NM. Metabolic evaluation and medical management of upper urinary tract stone disease. Guidelines from the Scandinavian Cooperative Group for Urinary Stones. Scand J Urol Nephrol. 1999; 33: 372-81.