

# 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:	
<b>Simple idiopathic calcium urolithiasis</b>	
<b>Complicated idiopathic calcium urolithiasis:</b>	
With hypercalciuria	
With hypocitraturia	
With both hypercalciuria and hypocitraturia	
With neither hypercalciuria nor hypocitraturia	
With unknown urine calcium and urine citrate	
<b>MIAF urolithiasis:</b>	
<b>Metabolic</b>	
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)	
<b>Infection stones</b>	
Anatomical or Functional abnormalities	
<b>Classification not possible</b> (incomplete diagnostics)	

Table 1. Classification.

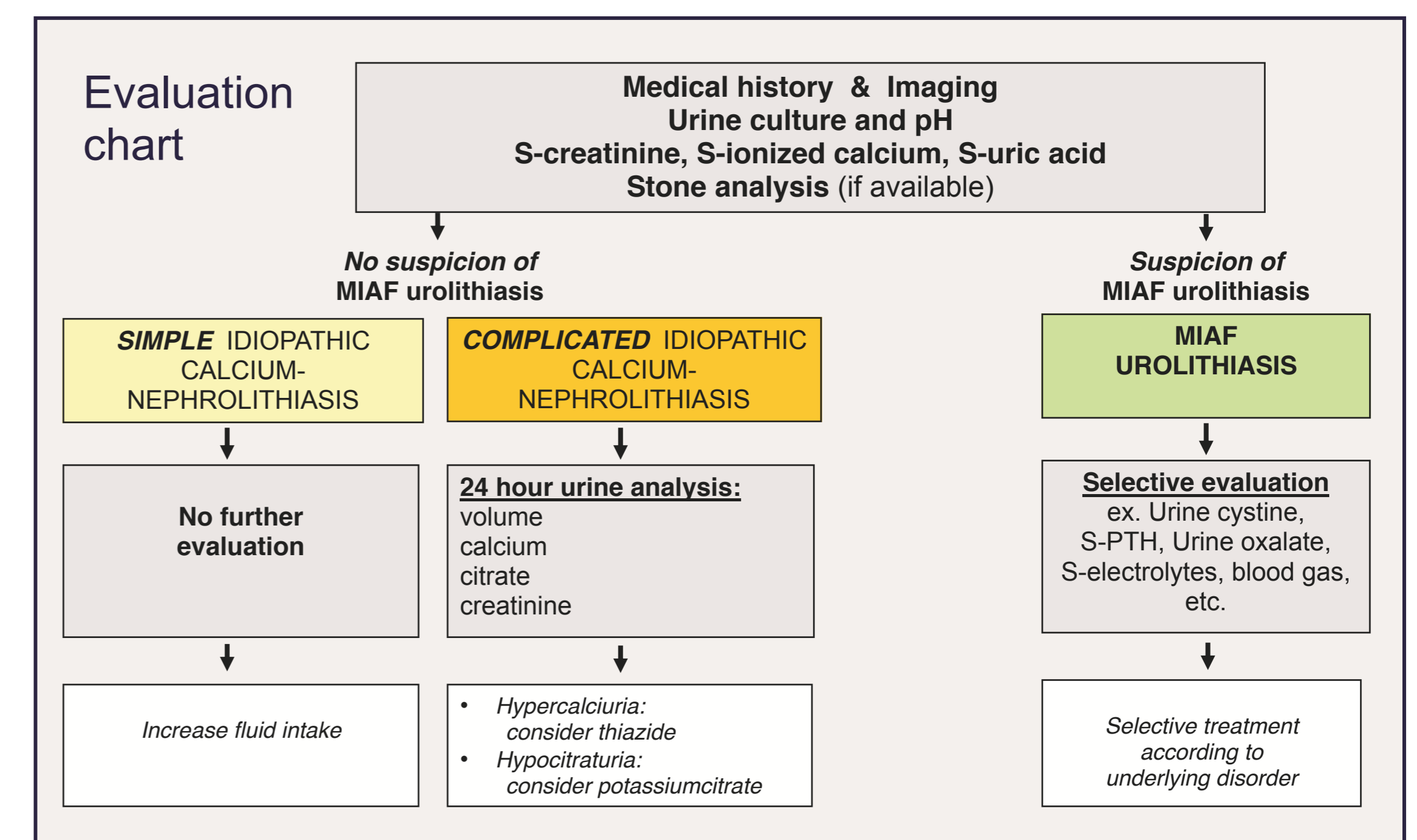


Fig. 1. Flowchart for evaluation and management.

Definition of simple and complicated stone disease	
<b>Simple stone disease:</b>	
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 endoscopic surgery.	
Insignificant recurrence of typical radiopaque stone.	
<b>Complicated stone disease:</b>	
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.

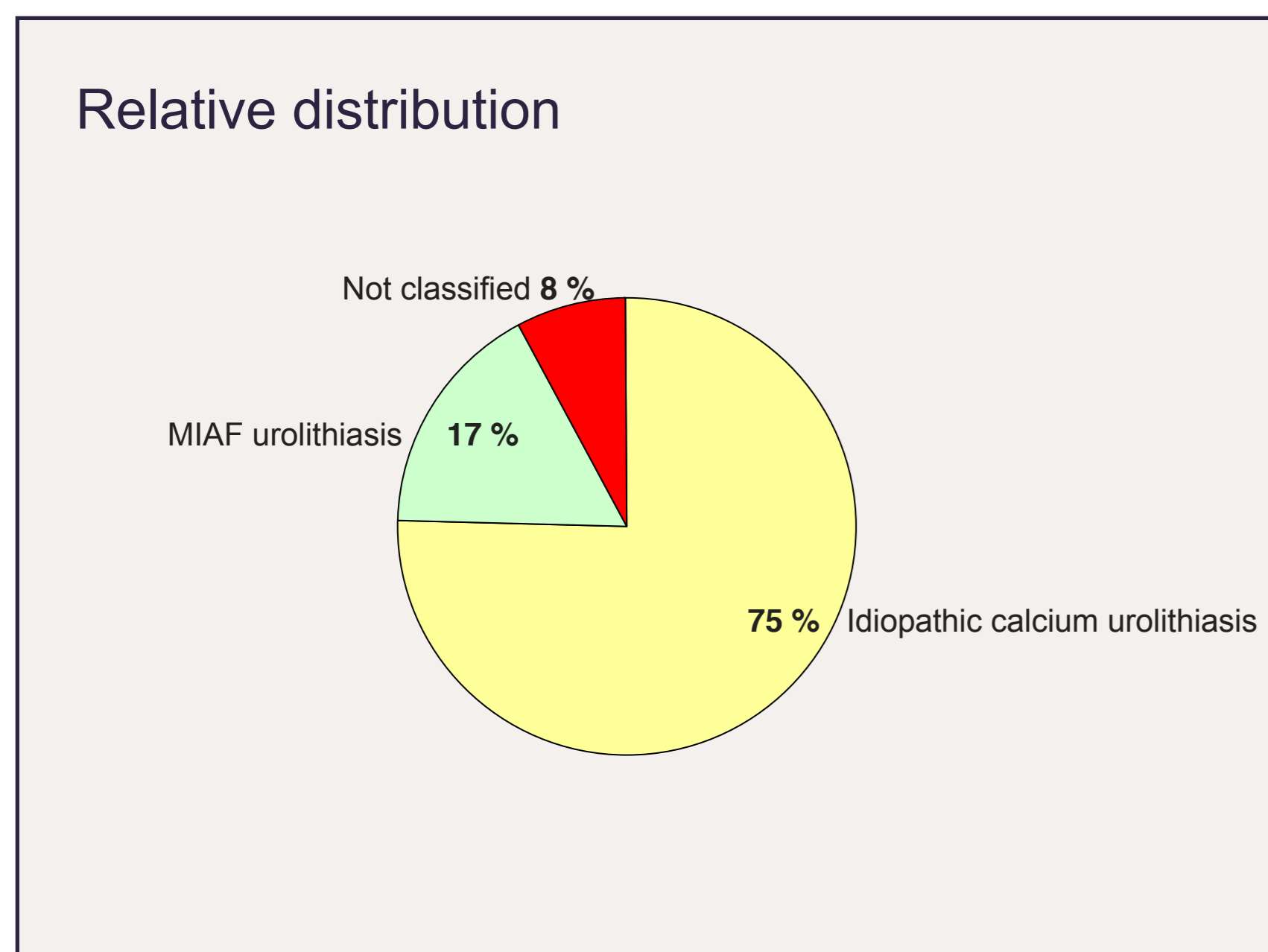


Fig. 2. Distribution of MIAF and idiopathic calcium urolithiasis.

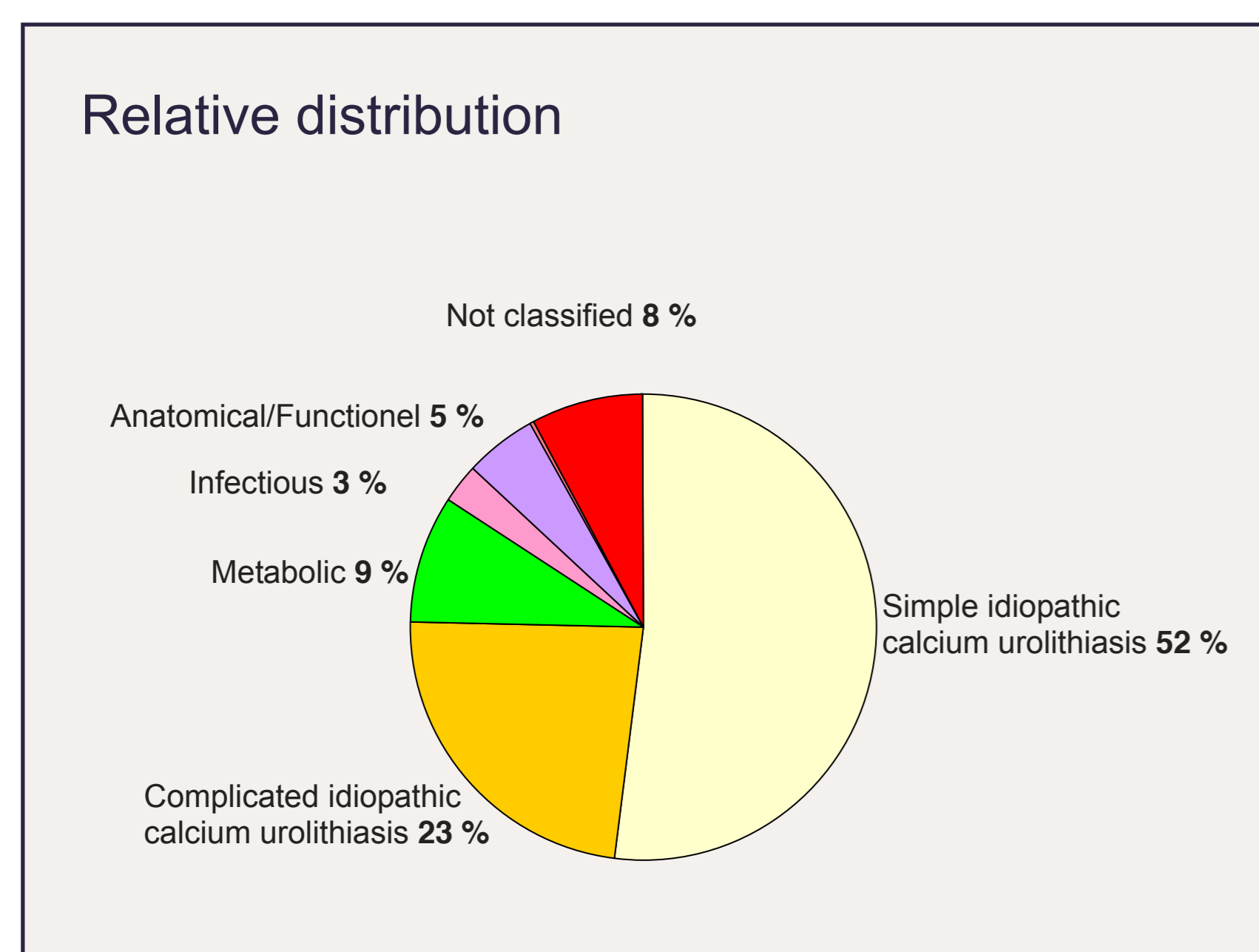


Fig. 3. Distribution of MIAF and idiopathic calcium urolithiasis.

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

	Classification	Number	%
<b>Idiopathic calcium urolithiasis</b> (n=1543)	<b>Simple</b> (n=1190)	1190	51.9
	<b>Complicated</b> (n=534)	48	2.1
	Complicated idiopathic calcium urolithiasis with hypercalciuria	155	6.8
	Complicated idiopathic calcium urolithiasis with hypocitraturia	19	0.8
	Complicated idiopathic calcium urolithiasis with both hypercalciuria and hypocitraturia	117	5.1
	Complicated idiopathic calcium urolithiasis with neither hypercalciuria nor hypocitraturia	195	8.5
<b>MIAF</b> (n=389)	<b>Metabolic</b> (n=214)	58	2.5
	Uric acid stone with hyperuricaemia	42	1.8
	Uric acid stone without hyperuricaemia	0	-
	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
<b>Infectious</b> (n=63)	Infection stones	63	2.7
<b>Anatomical/Functional</b> (n=112)	Anatomical or Functional abnormalities	112	4.9
<b>Not classified</b> (n=181)	Classification not possible (incomplete diagnostics)	181	7.9
<b>Total</b>		2294	100

Table 3. Overall number of patients according to classification.

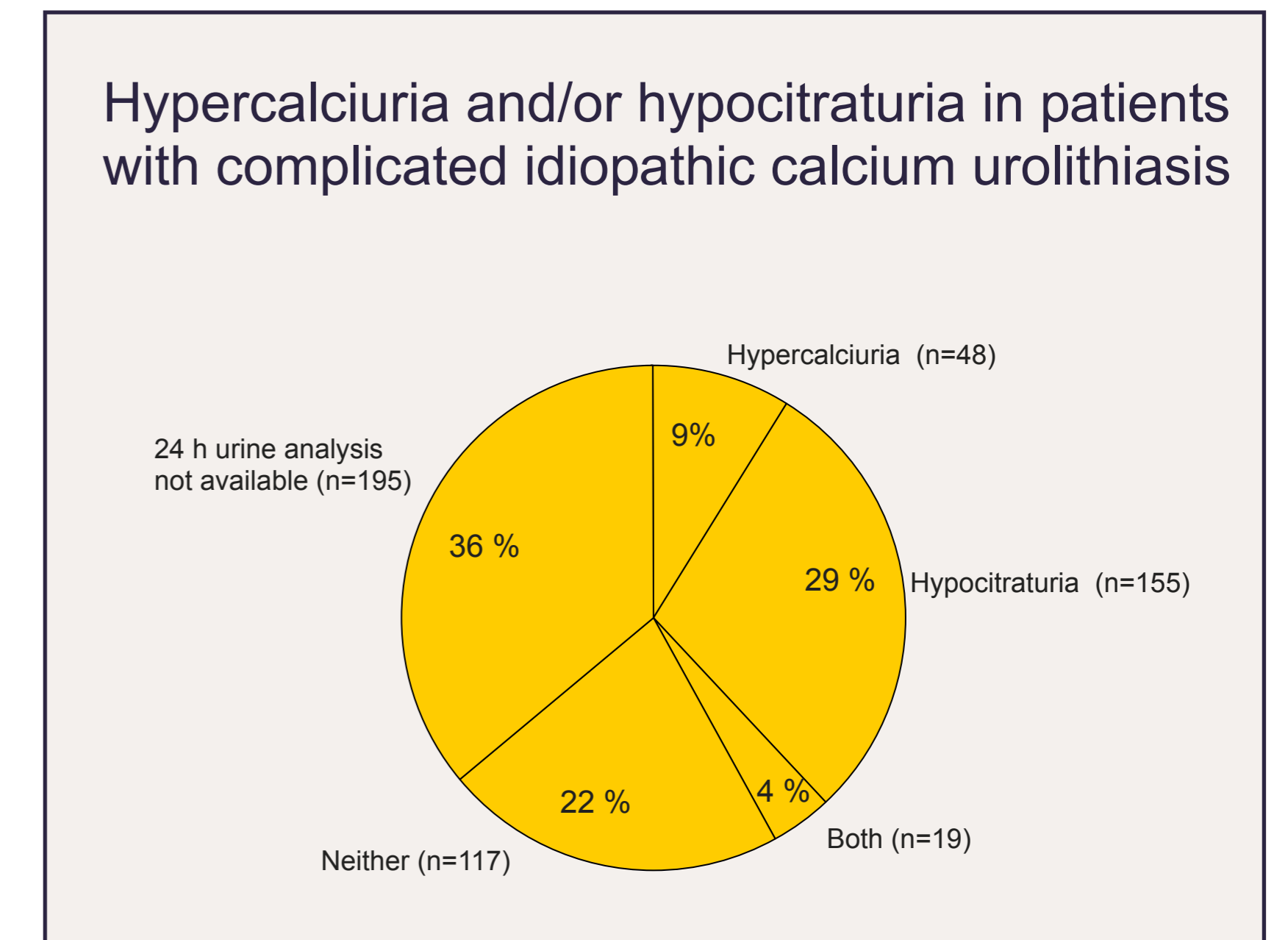


Fig. 4. Presence of hypercalciuria (> 0.1 mmol/kg/24 h) and/or hypocitraturia (< 2 mmol/24 h) in patients with complicated idiopathic calcium urolithiasis (N=534).

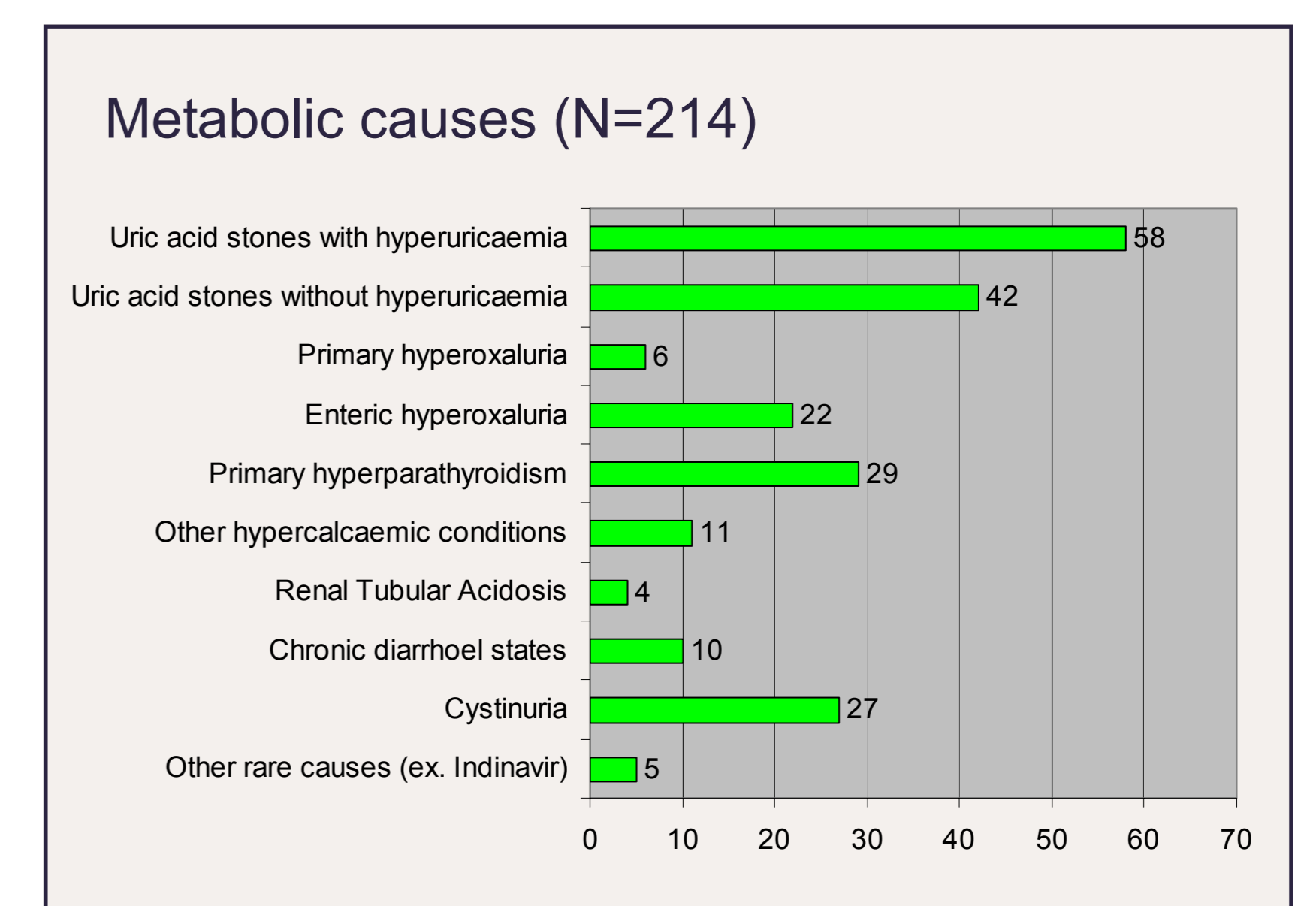


Fig. 5. Number of patients with metabolic causes (N=214).

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). There 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.