

Radioiodine treatment of Graves disease – dose/response analysis



Cepkova J.¹, Svilias I.¹, Krcalova E.², Horacek J.¹
 4th Department of Internal Medicine – Hematology and Endocrinology¹
 and Department of Nuclear Medicine², University Hospital Hradec
 Kralove, Charles University in Prague, Faculty of Medicine in Hradec
 Králové, Czech Republic



Introduction:

The objective of our research was to analyze the outcome of RAI therapy depending on the initial status of patients and to relate the success rate of RAI therapy to fixed activity and to the adjusted dose.

Patients and methods:

Graves patients (n = 603) treated with RAI in our unit between the years 1999-2012 were analyzed retrospectively

Results:

Response to RAI treatment/6 months

response	whole group (n = 603)	men (n = 103)	women (n = 500)
failure	159 (26%)	26 (25%)	133 (27%)
success	444 (74%)	77 (75%)	367 (73%)

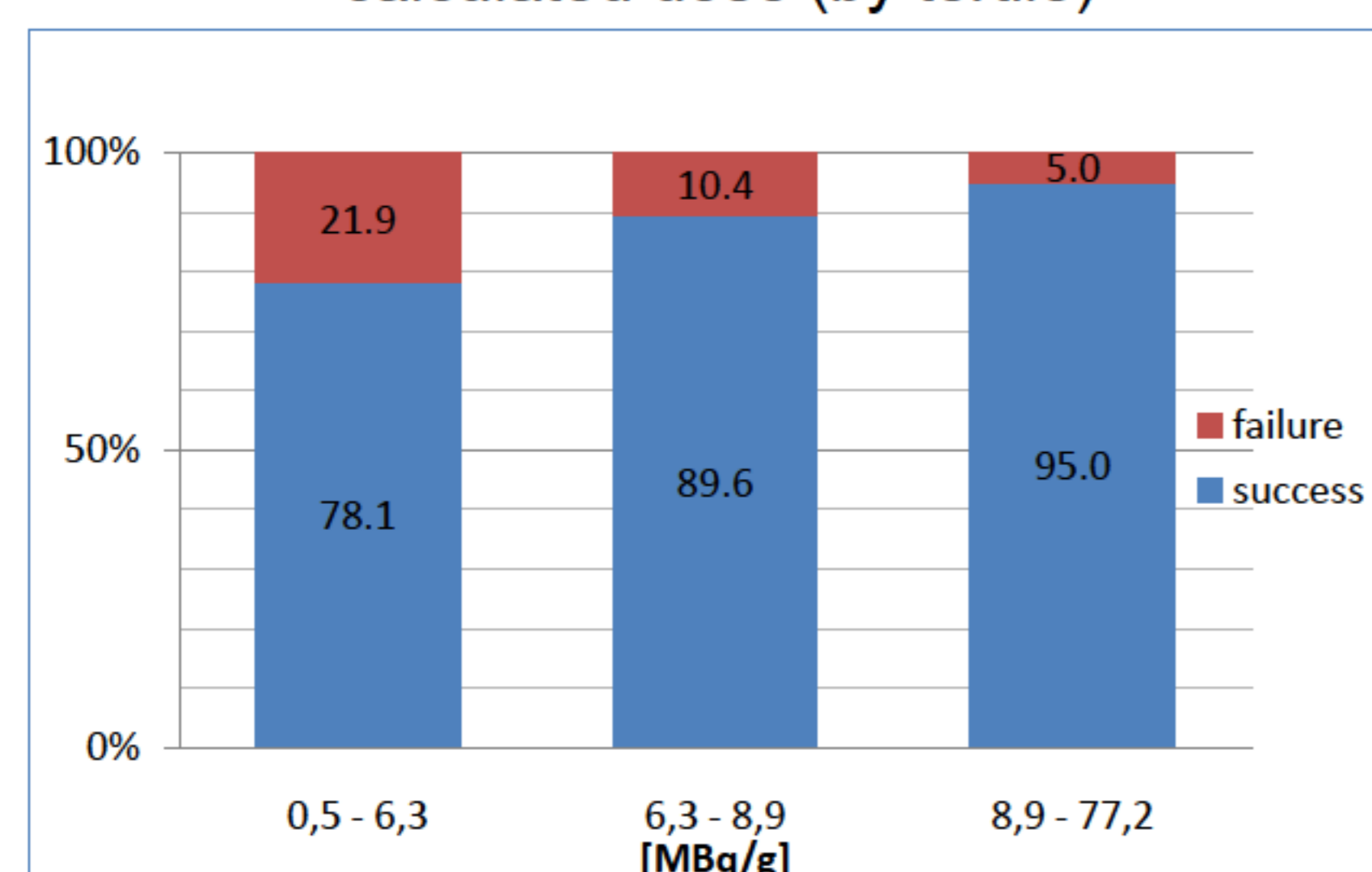
Response to RAI treatment/12 months

	whole group (n = 603)	men (n = 103)	women (n = 500)
failure	75 (12%)	15 (15%)	60 (12%)
success	528 (88%)	88 (85%)	440 (88%)

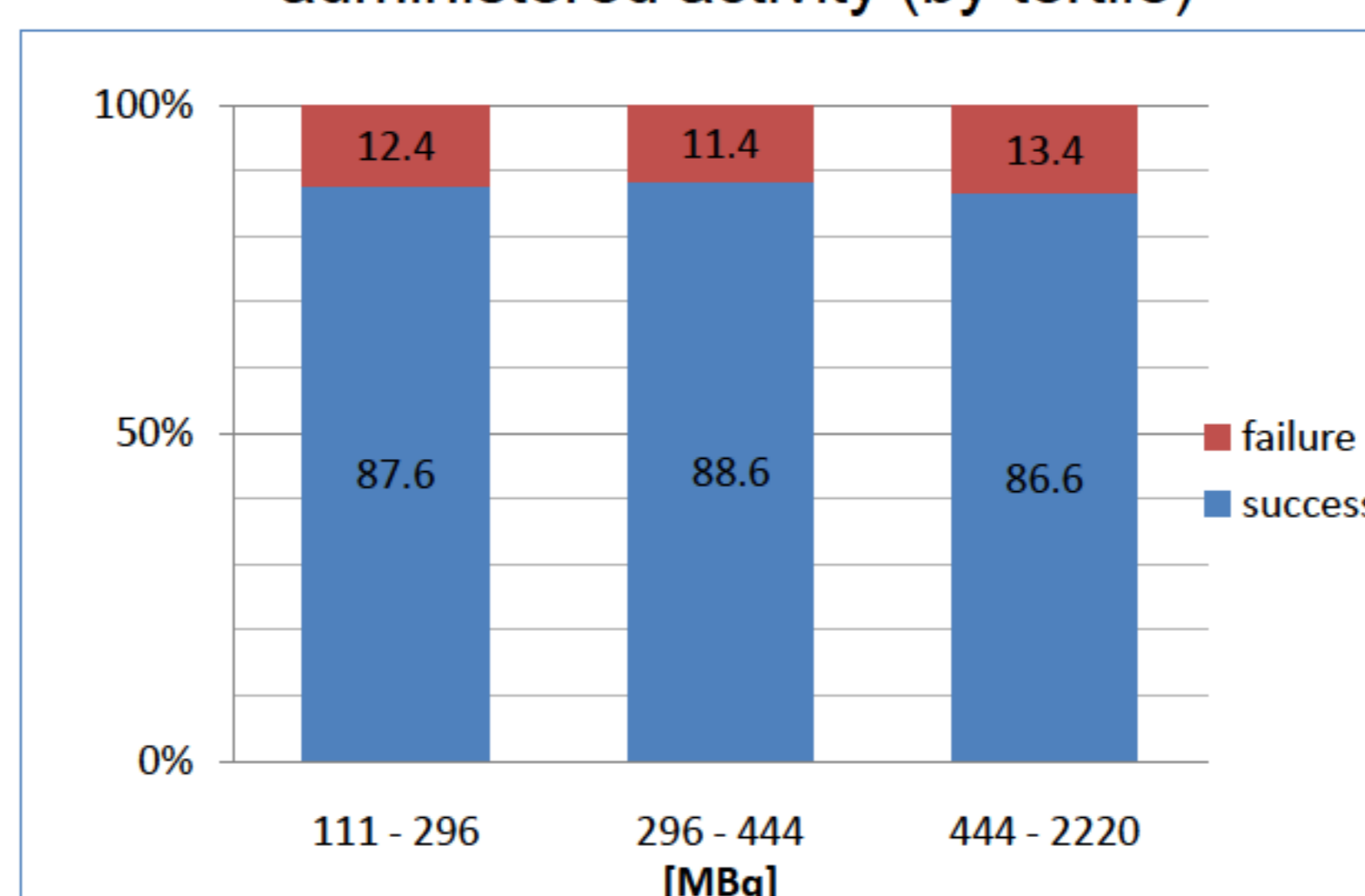
Dose dependence of success rate

Dose range [MBq/g]	Group (n)	Success rate/6M (%)	Success rate/12M (%)
0.5 – 5.0	120	54	72
5.1 – 8.4	239	71	86
8.5 – 77.2	244	85	96

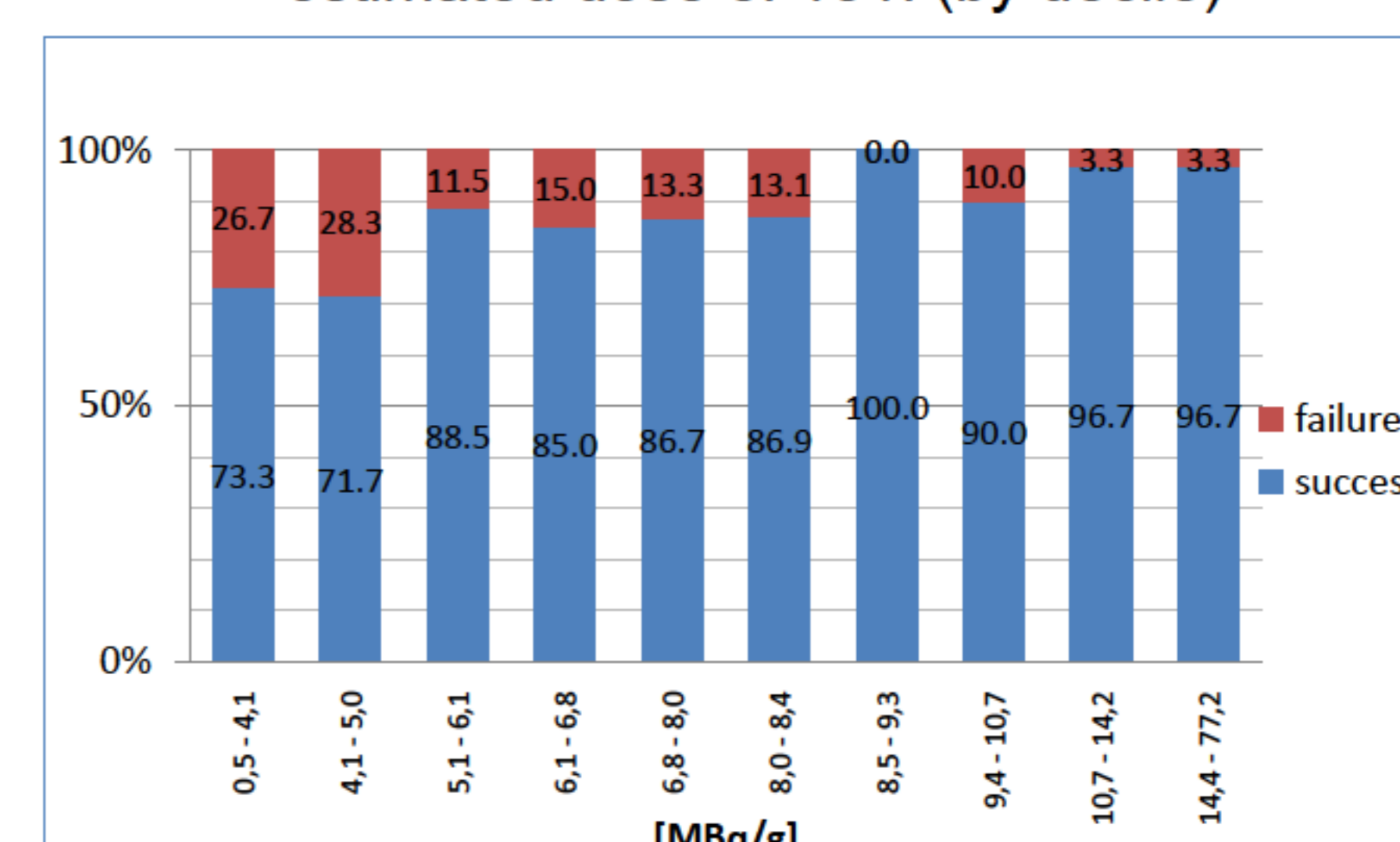
Comparison of low, intermediate and high calculated dose (by tertile)



Comparison of low, intermediate and high administered activity (by tertile)



Frequency of successful treatment as a function of estimated dose of 131I (by decile)



Baseline characteristics in clinically significant outcome groups

	Success (n=528)	Failure (n=75)	Chi-square	P
Age (years)	52 (43 – 60)	51 (42 – 60)	1.096	0.578
fT4 (pmol/l)	15.7 (13.3–19.4)	16.5 (13.2 – 27.8)	2.832	0.243
fT3 (pmol/l)	4.4 (3.7 – 5.8)	5.5 (4.2 – 9.8)	13.796	0.001
TSH (mIU/l)	0.7 (0.0 – 2.5)	0.2 (0.0 – 0.9)	12.151	0.002
Volume (ml)	24 (16 – 35)	37 (25 – 58)	36.454	<0.001
Uptake (% at 24h)	58 (42 – 74)	62 (51 – 75)	3.563	0.168
Activity given (MBq)	370 (257 – 555)	370 (259 – 490)	0.365	0.833
Dose per g at 24 h (MBq/g)	8.2 (6.0 – 10.4)	5.9 (4.2 – 7.7)	27.500	<0.001

Values are expressed as medians, with interquartile range in parentheses.
 P values apply to Mann-Whitney test.

Conclusion:

While the success rate of RAI therapy increased by rising adjusted dose, the RAI therapy didn't depend on the administered activity.

In patients with higher thyroid volume and higher disease activity there was an increased risk of treatment failure. The therapy efficacy didn't depend on sex and age.

With adjusted dose about 8.5 MBq/g, very reasonable efficacy was attained.