

Evaluation of Spontaneous Nocturnal GH Secretion: One versus two consecutive Nights

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Introduction: GH deficiency may be evaluated by spontaneous nocturnal GH secretion. Usually GH is determined in consecutive samples during one night. Since sleep may be disturbed by a new environment, a night to accustom is considered necessary by some investigators but questioned by others.

To assess the influence of the two settings on GH secretion and the diagnosis of GH deficiency, we examined spontaneous nocturnal GH secretion during 2 consecutive nights.

Methods: 49 girls and 56 boys with suspicion of GH deficiency were examined between 10 pm and 6am during 2 consecutive nights. They were administered to the hospital at 6 pm before the first examination night and dismissed in the morning after the second. The day in between the examination nights, they stayed in the hospital with the time at their free disposal. Blood was taken every 20 min via an intravenous catheter between 10pm and 6am. Sleep was recorded by the study nurse and GH was determined by ECLIA. GH deficiency was considered when maximal peak GH was below 12ng/ml or mean GH was below 2,8ng/ml in both nights.

Results:

- Sleep as well as GH secretion varied considerably between the 2 nights
- Sleep lasted from 4h to 9h 20min.
- There was no correlation between sleep duration or longest sleeping episode and GH peak or mean
- In a healthy patient even a sleep episode of 2:40 resulted in a GH peak > 30 ng/ml
- 26 Patients had reduced GH secretion in both nights, all of them had at least more than 6,5h continuous sleep during one night.
- **29 had a reduced GH in one of the nights,**
- **10 in the first and**
- **19 in the second,**
- **so that no GH deficiency was noted.**
- Sleep was slightly lower in the 1st than in the 2nd night (7,12h vs. 7,33h).
- The longest sleeping period was also higher in the 2nd night (6,21 vs 6,55h)
- Likewise, mean GH as well as peak GH concentration was higher in the 2nd night (4,45 vs 4,82 ng/ml and 15 vs 15,19 ng/ml).
- Statistically, there was a tendency towards longer sleep and higher GH secretion ($p < 0,1$) and a significant higher mean GH secretion in the 2nd night ($p < 0,035$).
- Regarding GH peaks and mean secretion only in the healthy and the GH deficient patients the second night had higher GH values ($p < 0,05$).

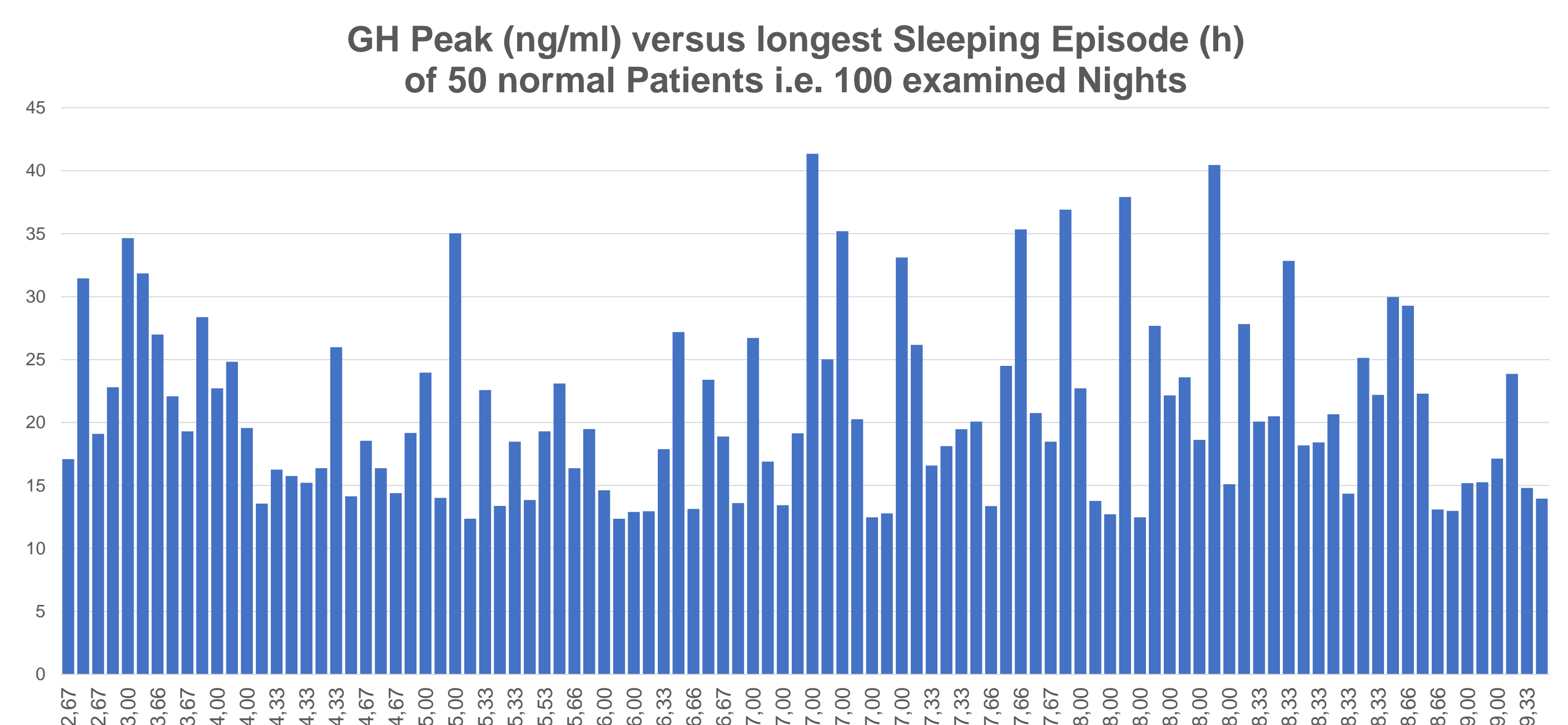
Discussion:

- GH secretion varies between 2 nights without significant changes in sleep
- Sleep duration is not correlated with GH peak or mean secretion
- Assessing only 1 night results in an underestimation of patients with normal GH secretion
- Under that assumption that normal GH secretion in one night reflects normal GH status, the evaluation of only one night will produce a higher number of patients falsely assigned GH deficiency.

Conclusion:

Evaluation of GH deficiency by assessment of spontaneous GH secretion should comprise of 2 consecutive nights instead of one to avoid overestimation of GH deficiency

Δ sleep duration 1 st - 2 nd night in h	Δ longest sleep episode 1 st - 2 nd night in h	Δ mean GH secretion 1 st - 2 nd night in ng/ml	Δ peak GH secretion 1 st - 2 nd night in ng/ml	
-0,20	-0,33	0,00	1,02	mean
0,00	0,00	0,10	-0,01	median
3,00	4,67	3,20	16,42	maximum
-4,33	-5,00	-2,20	-9,81	minimum
1,49	2,51	1,06	5,61	SD



	Sleep duration 1 st night in h	Longest sleep episode 1 st night in h	Sleep duration 2 nd night in h	Longest sleep episode 2 nd night in h	Mean GH in ng/ml 1 st night	Peak GH in ng/ml 1 st night	Mean GH in ng/ml 2 nd night	Peak GH in ng/ml 2 nd night	
All patients n = 105	7,12	6,21	7,31	6,55	4,46	15,19	4,80	15,00	mean
	7,33	6,83	7,33	7,00	4,15	13,97	4,00	13,04	median
	9,00	9,00	9,33	9,33	15,20	41,34	15,40	40,45	maximum
	4,00	2,00	4,00	2,33	0,40	1,74	0,70	1,83	minimum
	1,22	2,00	0,96	1,74	2,41	7,81	2,72	8,24	SD
Normal patients n = 50	7,17	6,08	7,35	6,46	5,93	20,25	6,69	21,07	mean
	7,50	7,00	7,33	7,00	5,40	18,55	6,70	19,57	median
	9,00	9,00	9,33	9,33	15,20	41,34	12,40	40,45	maximum
	4,33	2,00	4,67	2,67	3,00	12,36	3,00	12,36	minimum
	1,10	2,09	1,06	1,83	2,40	6,75	2,53	7,41	SD
Patients with abnormal results n = 55	7,08	6,35	7,31	6,65	3,04	10,52	2,96	9,40	mean
	7,33	6,67	7,33	7,33	3,00	9,74	3,00	8,62	median
	9,00	9,00	8,67	8,67	5,90	24,91	4,80	19,58	maximum
	4,00	2,66	4,00	2,33	0,40	1,74	0,70	1,83	minimum
	1,31	1,91	0,87	1,64	1,28	5,36	1,00	3,43	SD
Patients with GH deficiency n = 26	7,11	6,43	7,18	6,56	2,18	6,55	2,45	7,23	mean
	7,66	6,83	7,33	7,00	2,00	6,04	2,70	7,31	median
	8,67	8,67	8,67	8,67	4,10	11,32	4,50	11,21	maximum
	4,33	2,67	4,00	2,33	0,40	1,74	0,70	1,83	minimum
	1,24	1,86	1,05	1,59	0,94	2,69	0,97	2,36	SD
Patients with abnormal GH in 2 nd night n = 19	7,44	6,82	7,47	7,10	4,28	16,35	3,17	9,80	mean
	7,67	7,33	7,66	7,33	4,40	14,65	2,90	9,74	median
	9,00	9,00	8,33	8,33	5,90	24,91	4,50	14,87	maximum
	5,33	2,67	6,33	3,00	2,80	12,09	2,20	6,29	minimum
	1,13	1,75	0,54	1,25	0,82	4,00	0,76	2,27	SD
Patients with abnormal GH in 1 st night n = 10	6,33	5,23	7,33	6,03	2,93	9,73	3,90	14,29	mean
	6,83	4,67	7,17	6,67	2,90	9,76	3,95	13,99	median
	8,67	8,67	8,67	8,67	4,10	11,98	4,80	19,58	maximum
	4,00	2,66	6,00	2,66	1,20	5,59	2,80	12,12	minimum
	1,49	1,84	0,78	2,13	0,79	1,64	0,56	1,97	SD