

Quality of life, neurocognitive status and frequency of hypopituitarism following brain injury

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Background/Aim

- Post traumatic Hypopituitarism (PTHP) is common, its prevalence is about 30%. The predictive factors reported in the literature are :the severity of BI, Head imaging, Ischemic factors ,age ,BMI, skull base fracture .Alteration of quality of life and neurocognitive defects after TBI has been attributed by some authors to anterior pituitary deficiency but not by others.
- The aim of the study is firstly to assess the frequency of hypopituitarism 3 and 12 months following Brain injury (BI) in a sample of 133 victims of moderate to severe BI in two neighbors' hospitals in the east of Algiers .Secondly is to evaluate the quality of life and neurocognitive status of this cohort

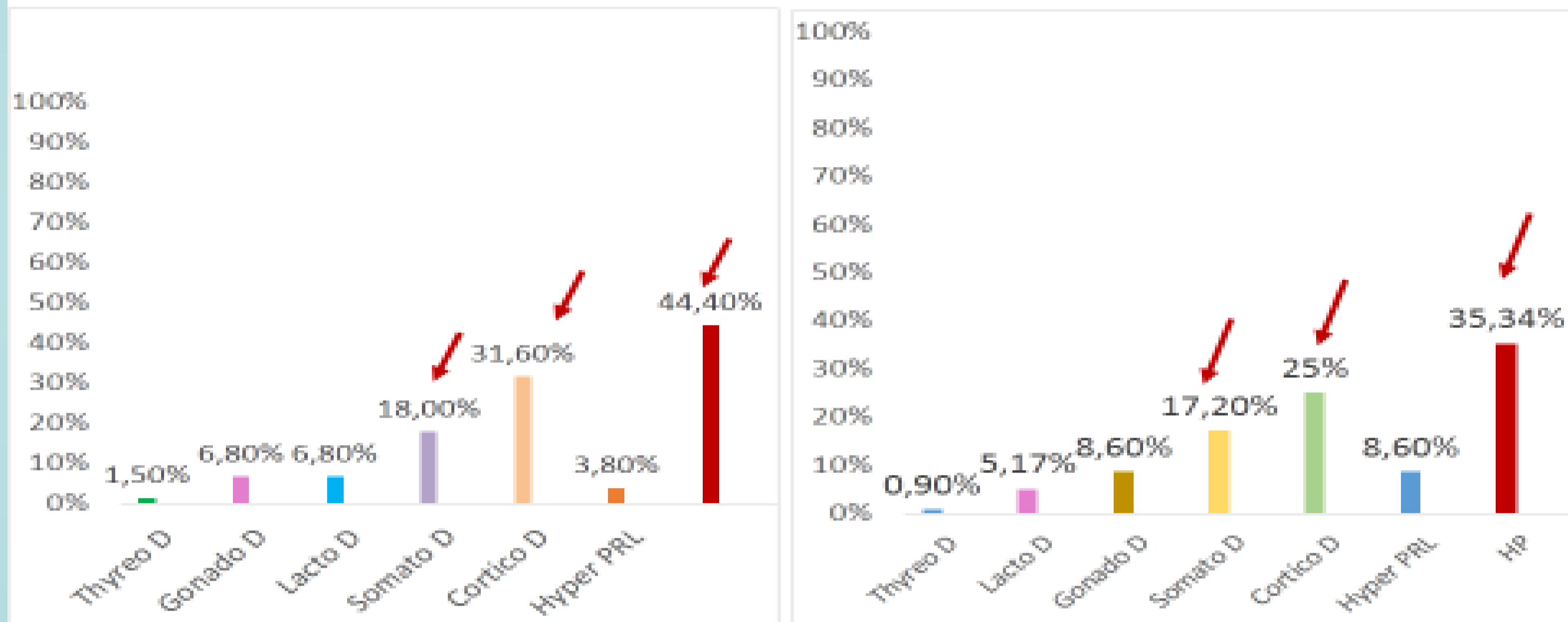
Method

- Hypopituitarism, evaluation of quality of life and neurocognitive status were searched in 133 victims of moderate to severe BI aged 18-65 years (M:32 y) Sex-ratio:15/1
- Clinical signs of hypopituitarism has been researched in 133 patients at 3 months and 116 patients at 12 months after BI.
- Cortisol, ACTH, FSH, LH, PRL, E2 (womens), testosterone (mals), IGF1, FT4, TSH ,GH after Insulin tolerance test using RIA and IRMA cis-biointernational kits has been dosed .
- Quality of life has been evaluated by two scales the AGHDA scale (Quality of life Growth hormone deficiency assessment) and the SF-36 scale.
- Neurocognitive status has been evaluated by NRS-R scale (neuro -comportemental rating scale) , a specific scale for brain injury.

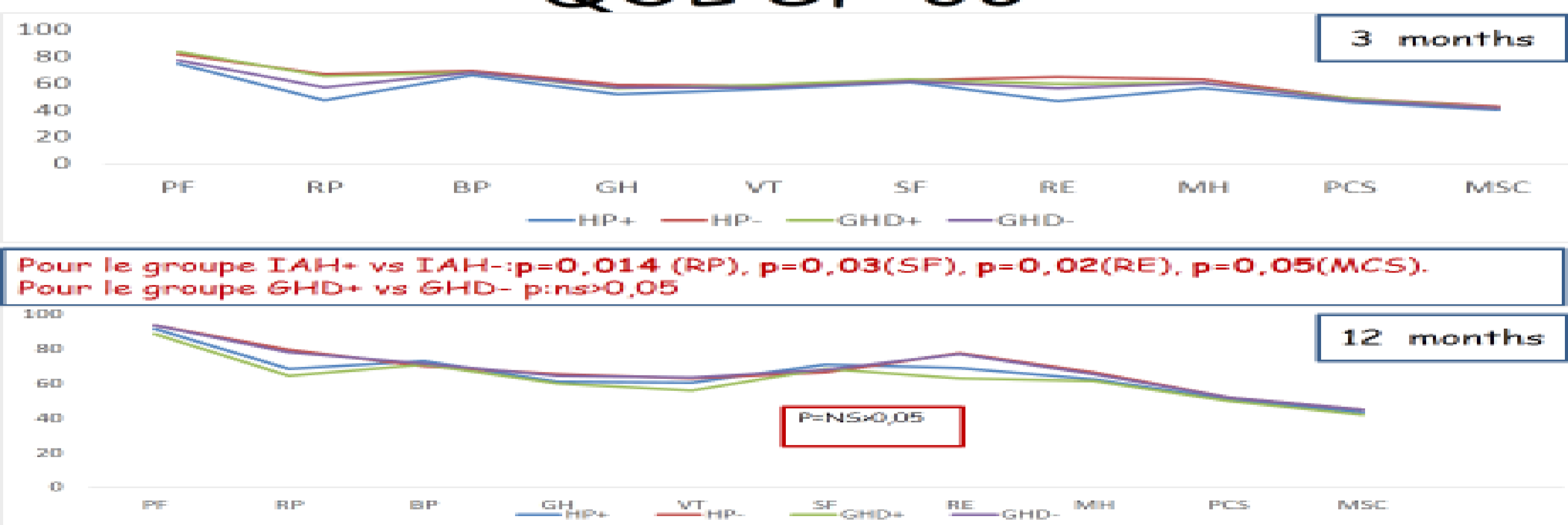
Frequency of PTHP

3 months after BI

12 months after BI



Comparison of HP+ vs HP- QOL SF-36



Comparison of the group HP+ vs HP- QOL AGHDA

3mois post-traumatisme	HP+	HP-	p	GHD+	GHD-	p
AGHDA score	9,75±7,60	6,04±7,0	0,0012	8,70	7,45	0,30

12 mois post-TC	HP+	HP-	p	GHD+	GHD-	p
AGHDA score	7,07±6,24	3,62±4,56	0,001	6,21±6,07	3,78±4,68	0,013

HP: hypopituitarism

Comparison of HP+ vs HP-/GHD+ vs GHD- QOL (SF-36)-littérature review-

Dimensions SF-36	Kelly GH+ GH- p=ns	Wachter HP+ HP- P=ns-	Bavisetty HP+ HP-	Nouroulahi HP+ HP-	Present study GHD+ GHD-
PF	63,6 72,1	72,9 57,9	72,9 71,3 P=0,96	P=0,018	88,95 93,68 P=ns
RP	21,4 47,2	100,7 100,7	45,8 49,1 P=0,83	P=0,023	64,47 78,16 P=ns
RE	47,6 83,3	80,6 63,2	69,4 80,2 P=0,49	P=0,023	63,16 77,01 P=ns
VT	47,7 63,7	53,3 48,7	57,1 63,1 P=0,44	P=0,025	56,05 63,51 P=ns
MH	57,7 77,4	64 63,2	68,7 76,5 P=0,18	Ns	61,47 65,78 P=ns
SF	60,7 76,4	77,1 71,4	63,5 76,9 P=0,1	Ns	68,42 68,25 P=ns
BP	55,0 76,2	46,8 44,1	70,2 78,2 P=0,304	Ns	70,95 71,43 P=ns
GH	57,9 76,9	61,2 60,1	62,9 75,1 P=0,048	P=0,004	59,95 64,7 p=ns

Comparison HP+/HP- GHD+/GHD-(neurocognitive evaluation)

3 months post-TC	HP+			HP-			p	
	Abs	min	mod	sev	Abs	min	mod sev	
attention disorders	40	17	1	0	64	4	6 0	0,00042
Memory disorders	24	22	12	0	52	13	9 0	0,003
Mood swings	40	19	9	0	64	7	3 0	0,049
Irritability	33	18	7	0	60	12	2 0	0,0066

At three months evaluation: There was no significant difference between growth hormone deficient and no deficient patients concerning neuro- cognitive evaluation

12 months after BI: There was no significant difference between HP+ vs HP- et GHD+ vs GHD- concerning neurocognitive evaluation for the 29 dimensions of the scale NRS-R

Comparison GHD+ vs GHD-: cognitive defects(littérature)

	Number	GHD+/GHD-		p	comments
Kelly	44	8	36	>0,05	memory, concentration, anxiety, mental fatigue.
Wachter	53	13	40	>0,05	anxiety, irritability, dépression, fatigue
Pavlovic	61	20	41	>0,05	memory, attention, executive function, comprehension
High	23	12	11	<0,05	mental flexibility, comprehension, matrix function
Léon Carrión	22	11	11	<0,05	Lien GHD attention, vigilance, memory, emotion, comprehension, sociability
Walter	22	12	10	<0,05	Relation GHD and cognitive defects
Bondanelli				0,05	Relation GHD and cognitive defects
Reimunde	19	11	08	<0,05	Comprehension, vocabulary, verbal function
Present study	116	20	94	P>0,05	No relation GHD cognitive troubles

Comment & conclusion

Mean age was 32 years with male predominance. Traffic accident was the most frequent cause of BI. The frequency of PTHP at three months after injury was 44% with 31, 5% of corticotrop failure, 18% of GH deficiency, 6, 8% of gonadotropin deficiency and 3,8% of hyperprolactinemia. Predictive factors of occurrence of PTHP was skull base fracture, duration of intubation and coma and initial traumatic imaging. The prevalence of PTHP at twelve months after injury was 34,5% with 25% of corticotrop failure, 17,2% of GH deficiency, 8,6% of gonadotropin deficiency, 5,17% of hypoprolactinemia, 0,9% of thyrotrophic deficiency and 8,6% of hyperprolactinemia. Predictive factors of Twelve months PTHP was the duration of intubation and coma and polytraumatism. A link was found between PTHP and impairment of quality of life at 3 months and one year using AGHDA and SF-36 scales. PTHP patients have more neurocognitive disorders using NRS-R scale than non hypopituitary patients at three months but not at 12 months after the injury. The link between GHD, hypopituitarism and alteration of QOL showed in this study has been previously reported by several authors.

The link between GHD, hypopituitarism and neuro-cognitive defects Has not be showed in the present study like others. These abnormalities may be due to neurological damage due to head injury .

- Kelly, D. & McArthur, D. Neurobehavioral and quality of life changes associated with growth hormone insufficiency after complicated mild, moderate, or severe traumatic brain injury. *J. ...* 23, 928-942 (2006).
- León-Carrión, J. et al. Cognitive deterioration due to GH deficiency in patients with traumatic brain injury: a preliminary report. *Brain Inj.* 21, 871-875 (2007).
- Wachter, D., Gündling, K., Oertel, M. F., Stracke, H. & Böker, D. K. Pituitary insufficiency after traumatic brain injury. *J. Clin. Neurosci.* 16, 202-208 (2009).
- Bavisetty, S., Dusick, J. R., Wang, C., Levin, H. & Ph, D. Chronic hypopituitarism after traumatic brain injury: risk assessment and relationship to outcome. *Neurosurgery* 62, 1080-93 (2008).
- Bondanelli, M. et al. Anterior pituitary function may predict functional and cognitive outcome in patients with traumatic brain injury undergoing rehabilitation. *J. Neurotrauma* 24, 1687-1697 (2007).
- Nouroulahi, S. Wille, J. Weiß, V. Quality-of-life in patients with post-traumatic hypopituitarism. *Brain injury* 1425-9 (2014)

- References:
- Pavlovic, D. et al. Chronic cognitive sequelae after traumatic brain injury are not related to growth hormone deficiency in adults. *Eur. J. Neurol.* 17, 696-702 (2010).
 - High, W. M. et al. Effect of growth hormone replacement therapy on cognition after traumatic brain injury. *J. Neurotrauma* 27, 1565-1575 (2010).