Traumatic brain and Brachial plexus injuries: An observational study of the epidemiology and analysis of factors affecting the outcome.

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Introduction

Among factors affecting the outcome in brachial plexus injuries, delay to referral and surgery, cerebral plasticity, as well as cognitive possibilities in the rehabilitation stage are of utmost importance. These factors can be modified by a simultaneous brain injury, but few reports have focused on this specific issue.

Methods

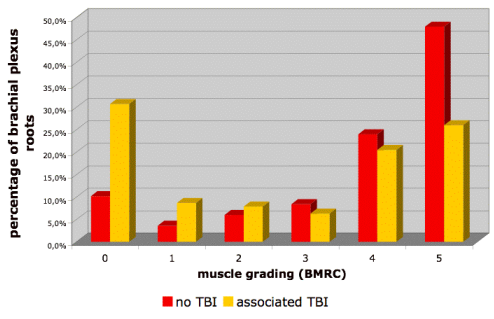
We retrospectively reviewed both our traumatic brain injury and brachial plexus (departement of neurosurgery) databases, over a 12-year period (2000- 2011). We identified 97 patients who where followed for a brachial plexus injury, distributed as follows : no concomittent head trauma (46 patients), concomittent mild head trauma (21 patients), moderate to severe head trauma (28 patients). Criterias used for mild head trauma were GCS 13-15, or loss of consciousness. Criterias for moderate-to-critical head trauma were GCS<13 or pahological findings in brain imaging. Most of the final neurologic exams were done by an independant examiner. Statistical test used were Kruskal-Wallis H-test and chi square test.

epidemiological datas of the 3 groups.

		nonTC	mild TC	sev TC
n		48	21	28
operated		98%	71%	64%
not refered to PB team		-	18%	14%
age		34,3	33,3	35,5
follow-up		88,6	81,3	80,5
sex		13%	14%	25%
dominant plexus involved		55%	45%	30%
comorbidities		28%	36,8%	56,0%
delay to referral		5,4	3,2	3,9
delay to surgery		7,4	4,5	6,9
mean last visit		26,0	22,8	22,5
clinical type	upper	67%	20%	54%
	lower	13%	5%	7%
	flail	21%	75%	39%
circumstances	car	21%	24%	37%
	motorbike	35%	38%	33%
	bicycle	0%	0%	15%
	pedestrian	0%	5%	4%
	fall	15%	14%	7%
	other	29%	19%	4%
bone lesion associated		45%	74%	25%
vascular lesion	no ischemia	91%	90%	92%
	mod isch	2%	0%	0%
	acute isch	6%	10%	8%
nbr avulsions	mean	0,3	1,5	1,5
	0	79%	37%	43%
	1	10%	21%	13%
	2	8%	16%	9%
	3	3%	16%	22%
	4	0%	5%	9%
	5	0%	5%	4%

this table shows differences between the 3 groups. In particular flail arms are more frequent in case of concomittent head trauma.

overall outcome in relation to concomitant head trauma

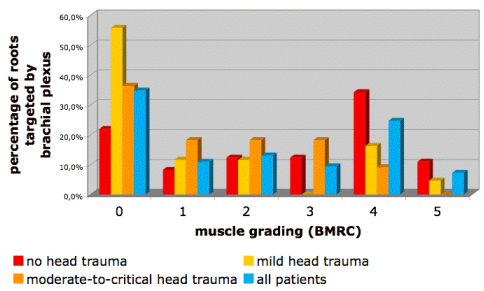


regardless of the brachial plexus strategy (surgery or observation), outcomes are worse in case of associated head trauma

Results

- description of the population is summerized in the table 1. In the head trauma population, most frequent neuropsychological issues involved memory (76%), attention (56%), executive functions (35%), global efficiency (29%) and psychoaffective aspect (29%). Glasgow Outcome Scale was favorable in all but one patient. Most frequent brain imaging were subarachnoid hemorrage and subdural hematomas. Time from trauma to referral and surgery were shorter in case of head trauma. Lesions of better prognosis were more frequent in the first group (less whole plexus involvment, more lacerations and gun-shot-wounds). Incidence of associated fracture and vascular injury, as markers of trauma velocity were similar in the 3 groups. Respectively 18% and 14% of patients with a concomitent head trauma were never referred to the brachial plexus team.
- Comparison of the motor outcome of the **operated** population showed a significant bad prognosis in case of head trauma (figure 1, p=0,0201). Comparing the **global** population (both patients operated and followed) showed the same result (figure 1, p<0,0001).

operative results in relation to the intensity of head trauma



brachial plexus surgery yields worse results in population of concomitant mild and severe head trauma than in the rest of the population. (p=0,0201)

Conclusions

Presence of a concomittant brain injury may adversely affect the motor outcome of the upper limb. Time to referral and time to surgery are similar in the populations, but differences in severity of the initial brachial plexus lesion could expain this phenomenon.

References

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