

Contusion injuries of the optic nerve - First results in thirty observations

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Abstract

The paper presents the first results of thirty cases of contusion injuries of optic nerve : an analysis of symptoms and the aspect of visual impairment. Indirect injury may damage the optic nerve and this leads to optic nerve contusions. In such cases, the fractures of the base of the skull, involving or not the optic canal, immediately leads to uni or bilateral blindness, stationary or slightly regressive.

Keywords: optic nerve, visual impairments

I have chosen 30 observations and I have studied the patients' symptoms presented at admission in the clinic in relation to the classical symptoms of the traumatic lesions to the optic nerve described in the literature.

The signs or symptoms of traumatic head injuries - like dizziness or coma - make it impossible to establish the diagnosis during the first hours or days. In terms of cerebral involvement, 21 cases presented simple commotions and 9 cases presented brain contusions followed by coma and late blindness. Sometimes, the ophthalmic examination can be difficult to perform due to the localization of the contusion (edema presented in 5 cases).

The aspect of visual impairment is different. Juge makes the following classification:

- visual impairments contemporary with the trauma
- late visual impairments

Visual impairments contemporary with the trauma may be divided into:

1. Immediate unilateral blindness

- in 19 cases. For all authors, this is the most frequent emergency (60 – 80%). In these cases, blindness is located on the same side as the trauma.

The main signs are: lack of light perception, mydriasis associated with lack of photomotor reflex, and conservation of the consensual reflex. All these were highlighted in 15 cases:

- in 3 cases – RFM and RC are present
- in 5 cases – RFM is absent and RC is present
- in 8 cases – RFM and RC are absent

For 2 observations I used a useful notion of semiology, namely the homolateral association of touching the optic nerve and the common oculomotor, association which makes it difficult to establish the diagnosis because in this case there is direct photomotor reflex and abolished consensual reflex on the injured side, and direct photomotor reflex kept and abolished consensual reflex on the healthy side.

2. *Bilateral visual impairments*

– 4 cases. It manifested by blindness in one eye and decrease of visual acuity.

Fundus examination remains normal for a long time, but after the fifteenth day optic atrophy can be observed.

3. *Partial visual impairments*

– immediately after the injury has taken place, in 5 cases. They manifested by decrease of visual acuity in the eye situated on the same side as the injury.

Late impairments

1. *Secondary impairments*

– several hours or days after the injury has taken place. In the studied series, a case presented a decrease of visual acuity (in the left eye) 12 hours after the injury.

2. *Late impairments*

– weeks or months after the injury has taken place and have more or less a progressive evolution. The decrease of visual acuity is frequent, the perimetric anomalies are constant, and the fundus examination is normal; sometimes papilloedema and optic atrophy can be observed.

During this study, I have met a case in

which 2 months after the injury blindness installed progressively in the right eye and there was also a decrease of visual acuity in the left eye. After 6 months, the fundus examination revealed optic atrophy.

When we talk about late impairments, we must take into account the possibility of producing a new injury of a different kind as well as the possibility of simulation or excessive fear which is part of the curing process of the injured people.

The spontaneous evolution of the impairments shows that they can be transitory, permanent or aggravated (Belloni).

Observation: B.A., aged 45, suffered a head injury - left frontal impact three weeks before the admission. Immediately after the injury had taken place, he observes a decrease of visual acuity in the left eye which gradually gets better.

Radiologic examination: suspected left orbital roof fracture, without involving the optical holes.

Unilateral immediate complete blindness which evolves spontaneously is usually permanent and leads to atrophy within 3 or 4 weeks.

Ophthalmologic examination

CASE		VISUAL ACUITY			FUNDUS EXAMINATION			RFM	RC	
0	1	2	3	4	5	6	7	8	9	10
1	AI	19 II RE = 0			19 II Pale papilla					
2	SP	LE - nd			Normal					
3	RP	21 IV LE p m m	23 IV pd la 20 cm	5 V LE pmm	21 IV Normal	5 V Papillary discoloration		+	+	
4	AV	LE = 0			Normal			Cannot be taken		
5	CD	30 XII RE = 0	8 I RE = 0		30 XII Partial discoloration	8 I Optic atrophy		Absent	Absent	
6	PC	6 XI LE pd at 50 cm			6 XI Temporary discoloration			+	+	
7	US	RE 0			RE Atrophy					

8	CA	30 XII	10 II LE = ¼ RE = pmm		30 XII papilla temporary discoloration	10 II RE atrophy LE temporary discoloration				
9	CG	LE = 0			Normal					
10	EC	9 I LE = 0	13 I LE = 0	19 I LE = 0	9 I Papilla with deleted edges	13 I Papilla with deleted edges	19 I Papillary discoloration	Absent	+	
11	ZI	LE = 0			Atrophy			Absent	Absent	Nerve III paralysis
12	PV	20 II RE = 0	26 II RE = 0	11 III RE = 0	20 II Normal	26 II Temporary discoloration	11 III Optic Atrophy	Absent	20 II Present 26 II Absent	
13	CA	18 X RE = 0 LE = 1/3	23 X RE = 0 LE = 1/3		18 X Physiological section n.o.	23 X Dilacerated papilla		Absent	Absent	Nerve III paralysis
14	GP	RE = 0			Normal	Atrophy				
15	BP	LE = 0 RE = pmm			Atrophy					
16	PM	RE = 0			RE Atrophy					
17	RV	14 X -	17 X RE = 0	27 X OD = 0	14 X Normal	17 X Papillo retinal edema	27 X Atrophy			Intra- operative nerve III paralysis
18	CV	RE = 0 LE = nd			Normal			Absent	+	
19	DM	22 II RE pmm LE nd 4m			Papilloedema					
20	DA	RE with no perception of light			Nasal pale papilla			Absent	Absent	
21	AP	29 XII LE sees 1 m	22 XII LE sees 4 m		Atrophy					
22	RC	RE = 0			RE - atrophy			Absent	Present	
23	BC	13 XI LE = 0	19 XI LE = 0		13 XI LE	19 XI LE atrophy				
24	TD	23 XII RE = 0	3 I RE = 0		23 XII Normal	3 I Temporary discoloration		Absent	Present	
25	FRS	22 I LE = 0	25 I vague perception of light		25 I Normal			Outlined	Outlined	
26	MI	RE = 0						Absent	Absent	
27	HV	8 I RE = pmm	24 I RE = 0		8 I Normal	24 I Normal		Absent	Absent	
28	RE	RE = 0			Normal					
29	DD	26 I LE = 0			26 I Normal			Absent	Absent	
30	IP	30 I RE = 0			30 I Normal			Absent	Absent	

Preoperative examinations

Case	Blindness	RFM	Mydriasis	Response	External muscles	PEV	Fundus examination	Interval between time of injury and timing of intervention	Fracture	
1	DA	Right eye	Absent	+	Present	Normal	-	<ul style="list-style-type: none"> • Right eye – nasal papilla with a slight tightening of the margins. • The rest in normal 	7 days	
2	CA	Right eye	Absent	+	Absent	Paralysis III	-	<ul style="list-style-type: none"> • Right eye – nasal papilla with total dilacerations and irregular margins. • Traumatic chorioretinitis 		
3	AI	Left eye				Normal	-	<ul style="list-style-type: none"> • Left eye – the papilla was pale 	30 days	
4	SP	Left eye – installed progressively 24 hours after the injury				Normal	-		7 days	

Conclusions

Indirect injury may damage the optic nerve and this leads to optic nerve contusions. In such cases, the fractures of the base of the skull, involving or not the optic canal, immediately leads to uni or bilateral blindness, stationary or slightly regressive. After imagistic examination, the fracture path can be visible or not at the level of the optic canal or hole, with no bone fragment compression.

References

1. Akor C and all Ophthalmic Plastic and Reconstructive surgery Journal 2003, 19.5, 466-469
2. Andrews DW and all - Neurosurgery 2002, 51.4, 890
3. Castros S and all - Rev.Oto- Neuro- Opht. 1960, 32, 57-64
4. Juge P. - Doctoral theses Paris 1955
5. Katzen J.T and all - Journal of Trauma 2003,54.5, 1026-34
6. Lazorthes G, and all - Ann Oculist 1962, 121, 361
7. Rocchi G and all - Surg.Neural 2005, 63, 554-564
8. Strieff E-B - Rev. Oto-Neuro-Opht. 1951, 4, 321
9. Turner V- Brain 1942, 66- 140- 151