Azienda Ospedaliera
Ospedale Niguarda Ca' Granda

Early pain relief from orthostatic headache and hearing changes in Spontaneous Intracranial Hypotension after Epidural Blood Patch: 28 cases report

E. Ferrante[1], V. Sangalli[1], E. Olgiati[1,2], F. Rubino[3], I. Arpino[3], E. Agostoni[1].

[1] Department of Neuroscience, Niguarda Ca'Granda Hospital, Milan, Italy
[2] Department of Psychology, University of Milano-Bicocca, Milan, Italy
[3] Department of Anesthesia, Niguarda Ca'Granda Hospital, Milan, Italy
e-mail: *enricoferrante@libero.it*

Aim

Spontaneous Intracranial Hypotension (SIH) is characterized by orthostatic headache (OH) and low CSF pressure; other symptoms can include diplopia, neck stiffness, alterations in hearing and nausea, rarely leading to numbness and coma. Our aim was to evaluate the epidural blood patch (EBP) efficacy on orthostatic headache (OH) and hearing change (HC) from spontaneous intracranial hypotension (SIH) with a visual analogue scale (VAS).

Methods

We recruited 28 (16 women; age 45±16 years-old; duration of disease median 63.5, IQR 27.5-166) consecutive patients who were admitted to the Neurology Ward and were eventually diagnosed as having SIH, according to the International Classification of Headache Disorder. Two Clinical Psychologists assessed the patients and asked them to rate on a VAS the intensity of their OH and their HC. Three different evaluations were conducted: as baseline measure, 24/48 hours before EBP (pre-EBP), 24/48 hours after EBP (post-EBP) and two months after EBP (follow-up). A Verbal Numeric Scale (VNS) was also used to evaluate the intensity of the headache at disease onset. We performed EBP under local anesthesia, using blood 5–45 mL mixed with contrast medium (5 mL of iopamidol). A follow-up visit was also conducted 50±16.2 days after treatment. A long-term telephone follow-up was introduced between 12 and 24 months after EBP.

Results

All 28 patients had OH, worsened in 20 of them by Valsalva-type maneuvers. 25 patients referred HC (tinnitus or muffled hearing) at symptoms onset, hereafter spontaneously regressed in 9 of them. At the baseline evaluation, 16 patients complained about HC. Demographic-clinical data, MRI findings (Fig 1), CSF opening pressure, blood amount EBP are shown in table 1. Before the treatment, at baseline measure (pre-EBP), patients rated their OH with median 5, IQR 2-7. 24/48 hours after EBP, a significant improvement of OH was found with median 0, IQR 0-0; p<.001. At the follow-up visit two months after EBP all patients achieved a complete relief from OH, with only 10 patients reporting tension-type headache (median 1.5, IQR 1-3). 16 patients also complained about HC and rated their disturbances in the pre-EBP evaluation with median 4, IQR 2-5.75. The post-EBP evaluation showed a significant improvement (median 1, IQR 0-2; p<.05) that remained stable at the follow-up, with only four patients reporting HC with range from 1 to 7). A long-term (range: 12-24 months after EBP) telephone follow-up was also conducted on 24 patients - they all denied the occurrence of any OH, with 3 cases reporting some degree HC, which are nonetheless hardly linked to SIH.

Patient	Sex	Age	Symptoms	Disease duration	Headache Location	Brain MRI	Spine MRI	LP	blood (ml)
1	F	37	OH, M, N, V	49	F	DPE, BCSH, BS	NR	NP	28
2	F	81	OH, VH, M, T, I	257	O	DPE	NP	NP	35
3	M	53	OH, VH, M	24	O	DPE, BCSH, BS	CPE, CEVPE	NP	40
4	M	31	OH, VH, M, T, N, DZ, IP	13	O	DPE	CPE	NP	40
5	M	49	OH, VH, M, T	77	FHE	DPE	NR	L CSF OP	35
6	M	61	OH, VH, M, T, RD	75	UR	DPE	NR	NP	25
7	F	53	OH, VH, M, T, N	45	O	DPE	NP	NP	28
8	F	45	OH, M, T, N, V, NS	66	O	DPE, BCSH, BS	NP	NP	30
9	F	40	OH, VH, V, DZ, NS	249	O	DPE, BCSH	NR	NP	25
10	F	68	OH, VH, M, ST	15	O	DPE, BCSH, BS	NP	NP	30
11	M	50	OH, VH, M, N, NS	57	O	DPE	NR	NP	45
12	M	51	OH, SN, RD	68	O	DPE, BCSH	CPE	NP	30
13	M	47	OH, M	38	F	DPE, BCSH	NR	NP	30
14	F	21	OH, VH, M, SN, IP	17	OFE	DPE	NR	NP	25
15	M	14	OH, M, T, N	177	F	DPE, BS	CEVPE	NP	35
16	M	33	OH, M, T, N, V	133	H	DPE, BCSH, BS	CEVPE, LEVPE, DECSFC, LECSFC	NP	40
17	F	42	OH, VH, M, T, N, V, NS	52	H	DPE, BS	NR	L CSF OP	35
18	F	35	OH, VH, M, T	111	OFE	DPE	CPE, DRPE	L CSF OP	35
19	M	37	OH, M, T, NS	48	O	DPE, BS	NR	NP	45
20	M	41	OH, VH, M, T	61	O	DPE	CPE, DRPE	L CSF OP	35
21	M	54	OH, VH, M	15	O	DPE, BCSH	NR	NP	33
22	M	59	OH, VH, M, T, V, , BC, RD, ST, S	247	O	DPE, BS	LEVPE	NP	35
23	F	54	OH, VH, NS, M, T	258	F	DPE, RCSH	NP	NP	5
24	F	31	OH, VH, M, N, V, NS	186	O	DPE, BS, PE	NP	NP	30
25	M	38	OH, VH, M, T	281	FOE	DPE, BS	NP	NP	15
26	M	19	OH, VH, T, NS	117	O	DPE	DRPE, LPE	L CSF OP	30
27	F	80	OH, VH, NS	13	O	DPE, BCSH	NP	NP	20
28	M	40	OH, M, T, DZ, N	12	F	DPE	NR	NP	35

Table 1. Table. Demographic-clinical data, MRI findings, CSF opening pressure, blood amount EBP.
OH = orthostatic headache; VH = Valsalva's maneuver-related headache; N = nausea; V = vomiting; RD = right diplopia; T = tinnitus; M = muffled hearing; DZ = dizziness; NS = neck stiffness; BP = back pain; BC = behavioral changes; I = imbalance; S = sleepiness; ST = slow thinking; DY = dysphagia; IP = interscapular pain; H = holocephalic;F = frontal; O = occipital; UR = unilateral right;FHE= frontal with holocephalicevolvement (diffusion); OFE =occipital with frontal evolvement(diffusion); FOE = frontal with occipital evolvement(diffusion); NP = not performed; NR = normal; BCSH = bilateral chronic subdural hematoms; RCSH = right chronic subdural hematomas; DPE = diffuse pachymeningeal enhancement; BS = brain sagging; LP = lumbar puncture; L CSF OP = low CSF opening pressure; CPE = cervical pachymeningeal enhancement; DRPE= dorsalpachymeningeal enhancement;LPE = lumbar pachymeningeal enhancement; CEVPE = cervical epidural venous plexus engorgement; LEVPE = lumbar epidural venous plexus engorgement; DECSFC =dorsal epidural CSF collection; LECSFC = lumbar epidural CSF collection.

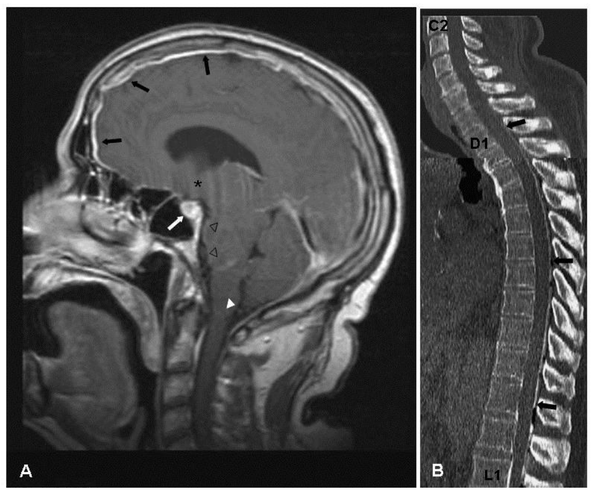

Figure A.
Brain MRI Sagittal T1 post-contrast w.i.: Diffuse pachimeningeal enhancement of hemispheric convexities (black arrows) and tentorium, pituitary gland enlargement (white arrows), flattening of ventral surface of the pons (black open arrowheads); brain sagging with downward displacement of the hypothalamic structures (asterisk) and cerebellar tonsils (white arrowheads).

Figure B.
Electronic reconstruction on sagittal plane of spiral CT, from C2 to L1, after EBP showing enhancing of the posterior epidural spaces extending from L1 to C7–D1 (black arrows).

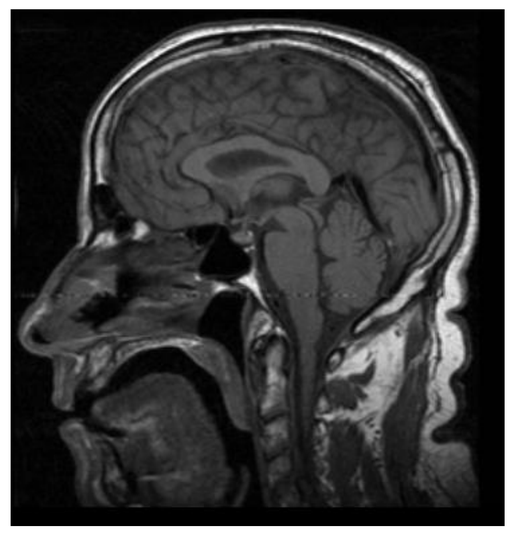

Figure C.
Brain MRI Sagittal T1 post-contrast w.i. acquired 4 months after the epidural blood patch procedure showing resolution of the previously described signs of SIH (Fig. A).

Conclusions

Autologous EBP is now recognized as the treatment of choice in those patients who have not responded to the initial trial of conservative management. Some patients may require more than one EBP. In conclusion to the best of our knowledge, this is the first time a specific pain assessment with VAS was conducted before and after EBP, showing a fast improvement of OH and HC in a large group of SIH patients. Importantly, patients have been followed up about two months and 13-25 months after discharge, which confirmed the effect to be complete and long-lasting

BIBLIOGRAPHY

Ferrante E, Arpino I, Citterio A, Wetzl R, Savino A. Epidural blood patch in Trendelenburg position pre-medicated with acetazolamide to treat spontaneous intracranial hypotension: report of 42 cases. European Journal of Neurology 2010; 17:715–719.