

# Can physicians prevent post-lumbar puncture headache or intracranial hypotension?

Lumbar puncture (LP) is an essential procedure applied for mostly diagnostic and sometimes therapeutic purposes. It is also necessary to measure the cerebrospinal fluid (CSF) biomarkers for determining the prognosis in some neurodegenerative and neuroinflammatory diseases.<sup>[1,2]</sup> However, it may lead to some complications such as post-lumbar puncture headache (PLPH) as commonly found. Furthermore, some cases suffering from headaches due to CSF leakage after LP for years have been reported.<sup>[3]</sup>

Although the exact mechanism of PLPH or post-dural puncture headache (PDPH) is not accurately known, various theories are available. These theories are mostly based on the loss of CSF volume. The most common theory is the occurrence of headache by pulling down of pain-sensitive structures after upright position due to CSF volume loss. The other theories are compensatory vasodilation of the intracranial arteries for maintenance of intracranial volume (Monroe-Kellie doctrine) and hypersensitivity to substance P.<sup>[4,5]</sup> Excellent results with epidural blood patch, especially if applied early in the course of PLPH, can be considered as proof of the CSF leakage.<sup>[3]</sup> In the study by Özdemir *et al.*, observation of intracranial hypotension with non-angular needle deformities is compatible with that idea also.<sup>[6]</sup> It is thought that blood patch pretending as gelatinous tamponade in the epidural space allows healing of the needle hole normally and prevents CSF leakage.<sup>[3]</sup>

Attention to procedure-related factors during LP may reduce the risk of PLPH. Operation-related risk factors for PLPH includes: (1) Equipment-related factors (needle type, size and shape); (2) procedure-related factors (bevel orientation, angle of insertion, stylet replacement); and (3) other factors such as operator experience.<sup>[7]</sup>

Although there are some other factors to cause PLPH, it is important to not ignore procedure-related factors. However, there are few studies on this issue. The study by Özdemir *et al.* is important in this regard.<sup>[6]</sup> In their report, procedure-related causes of PLPH were main themes as beside the other risk factors. Considering the frequency of difficulties during LP in our daily practice, importance of procedure-related factors may be seen more clearly. In a study by Shah *et al.*, LP were scaled as difficult (with requirement of 3 or more needlesticks, or requirement of a second clinician to complete procedure) in 47 (32%) out of 148 patients. In the same study, LP was traumatic in 16% of the patients.<sup>[8]</sup>

Özdemir *et al.* investigated the relationship between needle deflection occurred during LP and PLPH, interestingly.<sup>[6]</sup> The authors reported that although there were no correlation between the needle deflection and PLPH, intracranial hypotension was present in the patients with non-angular needle deformities. Thus, we may speculate that, this complication may be prevented in some degree if attention would be paid to procedure-related factors. The authors proposed to continue LP with a new needle if the needle axis deviated.

Additionally, considering the importance of the LP in medicine, studies on preventing LP complications are essential and may be expected to remain helpful in the future also.

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