

Injectate Viscosity Correlates the Volume Needed in Lumbar Transforaminal Epidural Injection

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Radicular pain is a type of low back pain which is often caused by herniation of the intervertebral disc and the prevalence is approximately 12%. Lumbar transforaminal epidural steroid injections (L-TFESIs) can be a therapeutic option for radicular pain patients whose pain is remain after conservative care. In the procedure of L-TFESIs, medication flows from the needle tip to the dorsal root ganglion then goes medial to the pedicle and reaches into the epidural space. We expected that injectate with lower viscosity than contrast would spread farther than contrast agent. The aim of this study is to evaluate the influence of injectate viscosity on the volume needed to reach specific landmarks in L-TFESIs. The patients over 20 years of age with low back and lower extremity pain who visited in the outpatient clinic during nine months were recruited. The L-TFESI was suggested to patients with little or no improvement of pain after at least one month of conservative management. The study subjects were divided into two groups by random selection method: raw viscosity group (RV) and low viscosity group (LV). In this study, contrast volumes were recorded as contrast flow reached specific anatomic landmarks as following: the medial aspect of the superior pedicle of the corresponding level of injection (PED), the superior aspect of the superior intervertebral disc of the corresponding level of injection (SIVD), the inferior aspect of the inferior intervertebral disc of the corresponding level of injection (IIVD), both the SIVD and IIVD (BIVD), beyond the midline, spinous process, of the contralateral spinal segment (MID). The differences in the demographic data, the types of injury, and the level of injection between two groups were not statistically significant. A multiple linear regression model was used to analyze the effect of the amount and viscosity on reach to the landmarks. The progression of the injected medicine to the specific landmark showed a positive correlation with amount of the injected medicine and negative correlation with the viscosity of the injected medicine. However, in the case of PED and MID, the influence of the viscosity of the injected medicine was not statistically significant. The epidural distribution of the contrast agent through the transforaminal approach was mostly affected by injection volume and was also affected by the viscosity of the injected medicine. The effect of the viscosity of the medicine was not significantly related to reaching to the nearest landmark of PED. However, the relationship between the possibility of reaching to SIVD and IIVD and viscosity of the injected medicine were statistically significant. Furthermore, the landmark of MID demanded relatively large amount of injected medicine to reach to the landmark, whereas the effect of viscosity on the reachability to MID was not significant.

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