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Anesthesiology
49:147-148, 1978

Time vs. Success Rate for Epidural Blood Patch

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Headache is a frequent complication of dural puncture, particularly with a large-bore needle.^{1,2} Epidural blood patching is a well-accepted therapeutic modality for dural puncture headache³; it seemed reasonable that the sooner done, the shorter would be the duration of the headache. We had noticed an unusually high failure rate of epidural blood patching done shortly after dural puncture. Therefore, the following study was undertaken.

METHODS

All cases in which epidural blood patching was done at the University of Utah Medical Center between January 1974 to July 1977 were studied. In all, 66 epidural blood patches were done for post-lumbar-puncture headache on ASA class 1-2 patients. Only these patients who had well-accepted symptoms of post-lumbar-puncture headache were included.¹⁻³ The patient's age, weight, height, sex, time of dural puncture, and time of epidural blood patching were recorded. Every patient in this study received 10 ml of autologous blood for the patch. Patches were rated unsuccessful, partially successful, or totally successful. Patients were randomly divided into two groups according to the intervals from dural puncture to epidural blood patching: an immediate group less than 24 hours, and a late group (more than 24 hours).

Twenty-four patients received inadvertent dural punctures during attempts at epidural anesthesia

TABLE 1. Time of Epidural Blood Patch Following Dural Puncture

	Less than 24 Hours	More than 24 Hours
Age (years, mean) (range)	34.4 (18-58)	29.6 (20-64)
Weight (kg, mean) (range)	70.6 (49.2-101.6)	64.3 (48.6-98.8)
Sex distribution	41 per cent male; 59 per cent female	45 per cent male; 55 per cent female

(utilizing an 18-gauge Tuohy or Crawford needle) for obstetric procedures (eight patients in the immediate group, and 16 patients in the late group); eight patients had dural-puncture headaches following diagnostic dural punctures (utilizing a 20-gauge spinal needle), all in the late group; eight general surgical patients received inadvertent dural punctures during attempted epidural anesthesia with an 18-gauge needle (four in the immediate group, four in the late group); eight patients received inadvertent dural puncture with an 18-gauge needle during treatment of a herniated lumbar disc (five in the immediate group, three in the late group). Correlations between success rate and the above-mentioned variables were obtained, utilizing chi-square and correlation coefficients. *P* values less than 0.05 were considered significant.

RESULTS

No significant difference could be related to patient age, height, weight, or sex (table 1). The rate of unsuccessful patches in the immediate group was 71 per cent, while patches done after 24 hours or more were 4 per cent unsuccessful (*P* < 0.001) (fig. 1). Eighteen per cent of epidural blood patches done in less than 24 hours were classed as partially successful, as were 18 per cent of those done after 24 hours (fig. 1).

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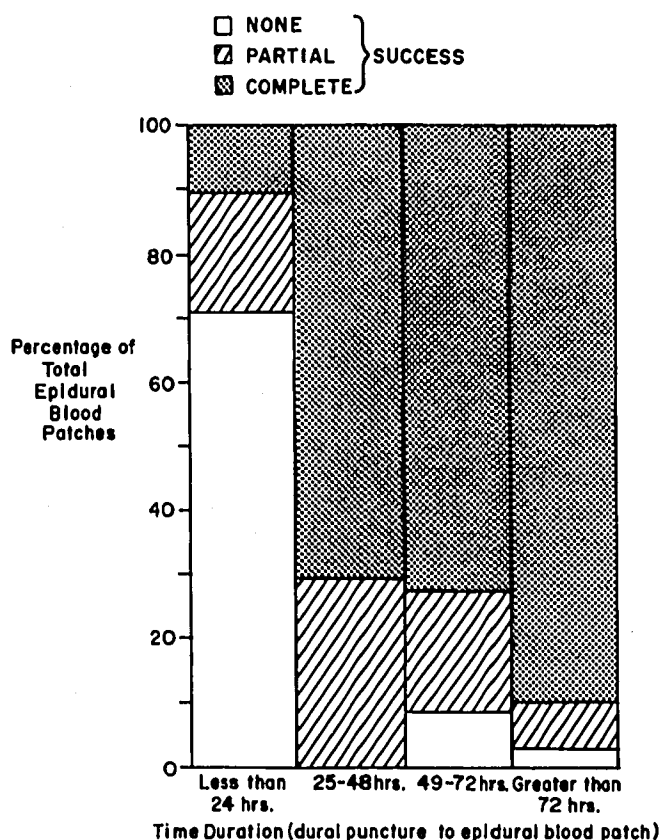


FIG. 1. Percentage partial or complete success rate of epidural blood patch for dural-puncture headache vs. time from dural puncture to epidural blood patch.

DISCUSSION

These data demonstrate that the success rate of epidural blood patching is influenced significantly by the time from dural puncture to patching. While the failure rate of patches done less than 24 hours after dural puncture was 71 per cent, that of patches done after 24 hours was 4 per cent.

Factors other than time from dural puncture to patching seem to have been excluded by the results of our study. No difference was seen in association with age, sex, height, or weight. Every patient received 10 ml of autologous blood for the patch; the loss-of-resistance technique was used to identify the epidural space. All patients had dural punctures with large-bore needles (15 with 20-gauge, the remainder with 18-gauge needles), and all were kept supine approximately four to six hours after epidural blood patching. No patient received any other treatment for post-lumbar-puncture headache except routine maintenance intravenous infusions. Thus, the only apparent variable remaining is time from dural puncture to epidural blood patching.

The efficacy of epidural blood patching for the treatment of dural-puncture headache was first demonstrated 17 years ago.⁴ The generally accepted

mechanism is plugging of the dural rent with an autologous blood clot, thereby preventing continued cerebrospinal fluid leak and subsequent intracranial hypotension. The effectiveness of epidural blood patching for dural-puncture headache is well documented. Abouleish *et al.*⁵ reported that initial blood patches done five days after dural puncture resulted in a success rate of 89 per cent, a result similar to our findings after 24 hours. In apparent contrast to our findings, Ozdil *et al.*⁶ reported that epidural blood patching utilizing clotted blood done immediately following dural puncture with a 20-gauge spinal needle resulted in a 0 per cent incidence of dural-puncture headache, while another group, under similar conditions, had a 15 per cent incidence of post-dural-puncture headache when epidural blood patching was not done. Even though patching was done before the onset of dural-puncture headache a 0 per cent incidence of headache (compared with a 14 per cent incidence with a 20-gauge needle without prophylactic patching²) is strong evidence for the efficacy of immediate epidural blood patching in preventing the headache. We cannot explain the apparent conflict between our findings and those of Ozdil *et al.*

The mechanism of the success of late patching in our study is open to speculation. Whether altered platelet function, a change of dural collagen structure (known to alter platelet adhesiveness⁷), or another mechanism is involved remains undetermined. Regardless, our data suggest that epidural blood patching done less than 24 hours after dural puncture has an unusually high failure rate. These data further suggest that an interval of at least 24 hours before administration of an epidural blood patch may be desirable in order to insure a high success rate.

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