



To investigate the influence of the number of T-junctions between central venous catheter and pressure transducer on measurement of central venous pressure (CVP) in patients” Cheng et al (2015).

Reference:

Cheng, X., Yang, W., An, Y., Teng, H., Zhang, R., Wang, Y., Gao, H., Hua, N. and Song, Y. (2015) The influence of joining central venous catheter and pressure transducer with T-junctions on central venous pressure. Zhonghua Wei Zhong Bing Ji Jiu Yi Xue. 27(8), p.691-694. .

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Abstract:

OBJECTIVE: To investigate the influence of the number of T-junctions between central venous catheter and pressure transducer on measurement of central venous pressure (CVP) in patients.

METHODS: A prospective controlled study was conducted. The patients with CVP monitoring in Department of Critical Care Medicine of the Fifth Center Hospital in Tianjin from February to October in 2014 were enrolled. The patients were divided into three groups according to

the number of T-junction between central venous catheter and pressure transducer: without T-junction control group and 1, 2, 3 T-junctions groups. In each patient, corresponding CVP values with different number of T-junctions placed between the central venous catheter and pressure sensors were determined within a certain period, and a square-wave graphic was obtained and preserved on the monitor. The own frequency (f_n) and the attenuation coefficient (D) of the system of pressure measurement were calculated after measurement of the shock wave following a square-wave to obtain the distance between two vibrations and the amplitude of the shock wave. The difference in CVP, f_n and D were compared among the groups.

RESULTS: A total of 20 cases were enrolled, and 150 groups of data were collected. (1) With the increase in the number of T-junction, CVP showed a tendency of gradual reduction. The CVP of the groups of control and 1, 2, 3 T-junctions was (7.00 ± 1.60), (7.00 ± 3.00), (5.00 ± 2.00), and (4.00 ± 1.00) mmHg ($1 \text{ mmHg} = 0.133 \text{ kPa}$), respectively. The CVP of 3 T-junctions group was significantly lower than that of the control group ($F = 9.333$, $P = 0.015$). (2) With an increase in the number of T-junction, f_n showed a tendency of gradual increase. The f_n of groups control and 1, 2, 3 T-junctions was (12.30 ± 0.79), (16.00 ± 0.91), (18.10 ± 1.75), (20.90 ± 2.69) Hz, respectively. The f_n of 1, 2, 3 T-junctions group was significantly higher than that of the control group ($F_1 = 45.962$, $F_2 = 45.414$, $F_3 = 46.830$, all $P = 0.000$); the f_n of groups 2 and 3 T-junctions was significantly higher than that of 1 T-junction group ($F_1 = 5.827$, $P_1 = 0.042$; $F_2 = 15.038$, $P_2 = 0.004$), but there was no significant difference between the groups of 2 T-junctions and 3 T-junctions ($F = 3.800$, $P = 0.087$). (3) With an increase of the number of T-junction, D also showed a tendency of gradual increase. The D of 1, 2, 3 T-junction group was 1.62 ± 0.27 , 1.60 ± 0.22 , 1.82 ± 0.25 , and 2.15 ± 0.58 , respectively. There were no differences among four groups.

CONCLUSIONS: After the application of T-junctions between central venous catheter and pressure transducer, CVP values will be underestimated, the reason of which is considered to be the increase in length and thinner lumen of the T-junctions.

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