TITLE: **Correlation of Transcranial Doppler and Cerebral Blood Flow in Patients with Postdural Headaches**

AUTHORS: DA Stump PhD, DL Bowton MD, DS Prough MD, SP Newman PhD and CH Tegeler MD

AFFILIATION: Departments of Anesthesia & Neurology Wake Forest University Medical Center Winston Salem NC, and Dept of Psychiatry, UCMSM, University of London

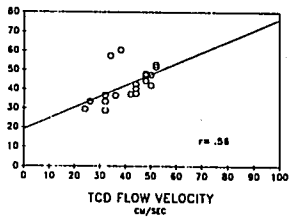
Introduction: A non-invasive method of monitoring the effects of treatment on cerebral blood flow (CBF) would be a valuable tool to the clinician. Transcranial doppler (TCD) is generally thought to provide qualitative information whereas the Xe-133 desaturation method of measuring CBF provides both regional and global quantitative information. Xe-133 is, however, considerably more difficult to use. We report here the relationship between mean flow velocity (FV) in the middle cerebral artery (MCA), assessed by TCD, and global Xe-133 CBF measurement in patients with postdural puncture headaches (PDH) before and after the IV infusion of caffeine.

METHODS: After IRB approval and written informed consent, five subjects with PDH were studied using a Carolina Medical Electronics TC2-64 TCD and Xe-133 clearance CBF method with a 16 channel instrument. Pain was measured by means of a Linear Analogue Pain Scale (LAPS), completed while sitting in an upright position, followed by a transcranial doppler ultrasound (TCD) assessment of FV in both MCAs. The patient then assumed a recumbent position and a baseline Xe-133 CBF was then performed. Following the administration of 500 mg. of caffeine, intravenously in one liter of lactated Ringers solution over one hour, a second CBF measurement and LAPS rating was performed. Immediately following the CBF study, the subject was placed in a sitting position and the second TCD measurement obtained.

Results: The graph shows the correlation between the FV and CBF measurements. Each patient provided 4 data points, 1 FV and 1 CBF value for each hemisphere obtained at two separate occasions. The r value of .56 is significant at the $p<.01$ level. The two data points that are outliers were obtained from the patient with the worst headache and may represent the difference in flow velocity and CBF when the artery is maximally dilated. The correlation without these two points is r=.90. The mean FV before caffeine infusion was 45 +/- 9 cm/sec and the CBF15 44 +/- 7 ml/100g/min. After infusion the mean FV was 36 +/- 6 cm/sec and the CBF15 was 40 +/- 11 ml/100g/min.

Discussion: The correlation between these two methods proved to be excellent except for the one patient during severe prodrome. These data suggest that TCD may be useful in monitoring changes in CBF in well defined situations, especially if first calibrated with a quantitative method such as the Xe-133 method.

However, caution must be used in interpreting the absolute FV value without careful definition of the patients clinical state in order to prevent confusion between changes in flow rate and arterial dimensions.



TITLE: ANALYSIS AND FREQUENCY OF ARTIFACTS GENERATED BY ANESTHESIA INFORMATION MANAGEMENT SYSTEMS

AUTHOR: David W. Edsall, M.D.

AFFILIATION: Anes Dept, Burbank Hospital,Fitchburg,MA

Many anesthetists fear the use of computers for documentation purposes during anesthesia. One of the fears is that artifacts will be recorded and pose a legal threat to the anesthetist. The fear is not supported by personal experience nor literature data.

Two groups, each consisting of 50 consecutive automated anesthesia records (Arkive, Diatek, San Diego, CA), were reviewed. The records were the actual printouts signed and placed in the medical record. All categories of automatically recorded vital signs were counted. Each entry was counted, except in the case of heart rate which was continuously recorded. Each individual time interval which had a heart rate recording was counted as one vital sign. Each individual artifact was counted, except in the case of heart rate when no more than one artifact per individual time interval was counted. Artifacts were classified into one of four categories Category 1, obvious artifact; Category 2, artifact noted by anesthetist; Category 3, probable artifact; Category 4, potential artifact. Vital signs reviewed were: heart rate, NIBP, S_pO_2, end tidal CO_2 and respiratory rate. Monitors used in the first group were: Datascope 2000 Series for heart rate and NIBP, SaraSat, and SaraCap. Monitors used for the second group were: Datascope 2000 Series for NIBP and heart rate, Datex Capnomac, and Datex Satlite.

The results are shown in Table 1. Only $ETCO_2$ recordings for general anesthesia were analyzed. Artifacts occurred for three basic reasons: Disconnects with EKG or S_pO_2 (these problems were largely solved between the first and second group through software changes); Bovie interference with EKG or S_pO_2; peripheral vasoconstriction with S_pO_2. The last two problems can be greatly improved upon by switching to monitors that provide a more reliable signal as in the case of S_pO_2.

Since Arkive reduces documentation time by 65%, artifact notes take between five and fifteen seconds, and artifacts occur no more frequently than once per hour, we feel that the artifact issue is minor.

In Summary, artifacts are infrequent occurrences that are easily managed by the anesthetist during the case. Frequency can be expected to be even lower with future software modifications. However, the main burden of artifact prevention should lie with the manufacturers of the patient monitors. It should display only reliable information.

TABLE 1

Grp	#Cases	#Min	#Vital Signs	%Artifacts Class 1&2	%Artifacts Class 1-4	Anes min/artifact	
I*	50	3684	4868	1.19	2.85	63	28
II*	50	3972	5491	0.2	0.5	180	82

*11/88 Sara, Datascope
** 12/89 Datex, Datascope