

Title: COMPARISON OF TWO TYPES OF NONINVASIVE BLOOD PRESSURE MONITORS

Authors: M.S. Gorbach M.D. and T.J. Quill M.D.

Affiliation: Department of Anesthesiology, Duke University Medical Center, Durham, NC 27710

Introduction. Although the accuracy of both oscillometric (OSC)^{1,2} and Penaz (PEN)^{2,3} non-invasive blood pressure (NIBP) monitors has been examined, only one study has compared the two techniques on the same patient. Although this latter study included 32 patients, regression data were presented for only 5.² Additionally, previous studies have relied upon analog recordings of intra-arterial catheter pressure (IAC). We report a comparative study of OSC and PEN with respect to IAC employing computerized automated data acquisition, and present regression data for 32 patients.

Methods. With approval of the Institutional Review Board, 32 patients (average age 56 years, range 19-77) who required IAC for intraoperative monitoring during noncardiac surgery had PEN placed on the ipsilateral, and OSC on the contralateral arm. The OSC device was a Dinamap 1846XT (tm), and the PEN a Finapres 2300 (tm). Data were downloaded via serial communications ports to a Zenith 151 computer. IAC apparatus consisted of a 20g I.V. catheter, a Gould disposable transducer with 53 cm of Cobe tubing, and a SpaceLabs 511 monitor; no system employed was found to have resonant frequency below 25 Hz. OSC readings were obtained in both arms preoperatively to exclude patients with anatomic pressure differences between arms. Since the downloaded values from the SpaceLabs monitor were digital readouts, these values were compared to those determined from a strip recording to exclude patients with > 5 mm Hg disagreement. All three devices were polled every 20 seconds for the first 10 minutes, and then every 1 minute. OSC was set to obtain new measurements every 60 seconds for the first ten minutes, then every 3 minutes.

Results. Only data recorded when a new OSC reading was available are reported here. Only data for mean arterial pressure (MAP) are described here in detail. 1,472 data points were obtained, and individual linear regressions were performed for each patient for systolic, diastolic, and mean pressure, with NIBP as the dependent and IAC as the independent variable. PEN generally correlated better than OSC (table 1). This is demonstrated in figures 1 and 2, which show pooled MAP data for PEN vs IAC and OSC vs IAC, respectively. In 3 subjects there was overall poor correlation with IAC for both PEN and OSC; this was usually seen in patients with compromised peripheral circulation (e.g. very cold hands, unobtainable pulse oximeter reading). In 7 cases there was poor overall correlation only for OSC. There was also a trend for both NIBP devices to become more accurate with time.

Discussion. Our linear regression findings are in agreement with previously published values^{1,2,3}, indicating that computerized data acquisition is a valid technique for this type of study. In con-

trast with other studies^{1,2,3} there were cases where both techniques were unreliable on the same patient. This requires further investigation. PEN tends to be more accurate than OSC in individual patients and in pooled data.

TABLE 1

r value for:	MEAN	S.D.	Range
PEN systolic	0.89	0.09	0.64 - 0.99
OSC systolic	0.82	0.08	0.53 - 0.98
PEN diastolic	0.83	0.14	0.28 - 0.98
OSC diastolic	0.79	0.16	0.22 - 0.97
PEN mean	0.90	0.07	0.72 - 0.99
OSC mean	0.84	0.09	0.61 - 0.99

References.

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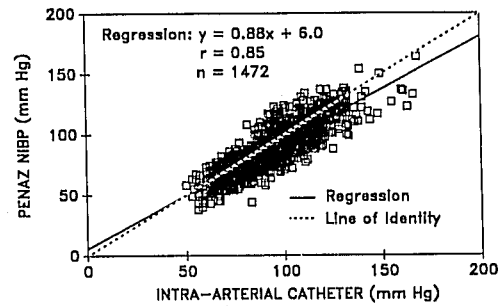


Figure 1

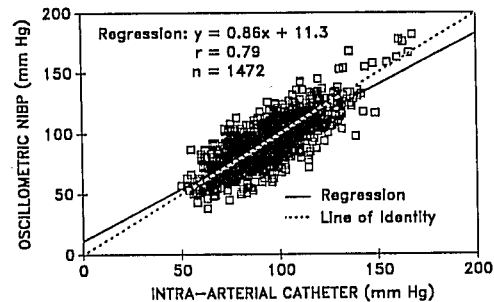


Figure 2