

Title: WHAT BLOOD PRESSURES WILL AUTOMATIC RECORDKEEPERS RECORD DURING ANESTHESIA?

Authors: F. E. Block, Jr., M.D.

Affiliation: Department of Anesthesiology, The Ohio State University, N-429 Doan Hall, 410 West 10th Avenue, Columbus, OH 43210-1228

Introduction. Automatic record-keepers in the operating room will dutifully record whatever blood pressure readings are determined by a non-invasive blood pressure device. This study documented the range of blood pressures that anesthesiologists may expect to be recorded.

Methods. The non-invasive systolic blood pressure recordings from 118 printed automatic records were reviewed. Sixty-three recordings with pressures from a Dinamap 1846SX documented by a Diatek Arkive recordkeeper, and 55 with pressures from a Datascope Accutorr recorded by a Datascope Datatrac recordkeeper were examined. All patients were adults; many were elderly. Many patients had pre-existing medical conditions such as hypertension and coronary artery disease. The patients had a variety of surgical procedures performed with different kinds of anesthesia, which included monitored anesthesia care. Non-invasive blood pressures were monitored from an appropriate cuff on the patient's upper arm or ankle. Recordings were done by a private practice anesthesiologist in a community hospital setting. The anesthesiologist used medical judgment to determine whether, when, and how to treat low or high blood pressure readings.

The Datatrac recorded every blood pressure determination. The Arkive averaged blood pressures if there was more than one reading in a two-minute period.

Results. Recorded systolic blood pressures are presented in Figure 1. Each column indicates the percentage of the total 4935 readings that fell within the indicated range.

A second way of examining these data is to ask how many cases (or what percent) had one or more blood pressures in each blood pressure range. In Figure 2, each column indicates the percentage of the 118 cases that had one or more systolic pressure readings within the indicated range.

Discussion. Several companies are now marketing automatic anesthesia recordkeeping devices. An earlier study has shown that blood pressure recorded by an automatic device differs sharply from that recorded on a manual anesthetic record¹. Anesthesiologists commonly smooth out the peaks and valleys of blood pressure determination, so that the high pressures are recorded a little lower, and the low pressures, a little higher, than what they really are.

Those who might consider acquiring an automatic recordkeeper frequently express a fear that the device will record the blood pressures exactly as measured by a non-invasive device. Thus, there would be no smoothing effect on an automated record, unless the record employed some form of averaging. An additional concern is that erroneous or artifactual blood pressures might be incorporated into the record.

An analysis of these 118 records reveals a certain percentage of cases with very high or very low blood pressure readings. Unanswered is the question of how many of these blood pressure readings were erroneous or artifactual. Clearly this question cannot be addressed retrospectively, but even at the instant of determination one could not be sure unless a second blood pressure measurement, such as an invasive arterial pressure, were available.

Despite the recorded range of blood pressures, all patients survived their surgery and suffered no anesthetic sequelae.

An automated record does not document patient values but rather monitor values, that is, the data presented to the anesthesiologist during the case. The anesthesiologist must always use his best judgment as to which data to believe and which data to treat. Variations in blood pressure, common during one's routine daily activities, are also frequent under anesthesia. As further data are acquired, it may even become apparent that the recording of these blood pressure variations is enlightening rather than harmful.

Reference

1. Zollinger RM Jr, Krueh JF, Schneider AJ. Man-made versus computer-generated anesthesia records. J Surg Res 22:419-424, 1977

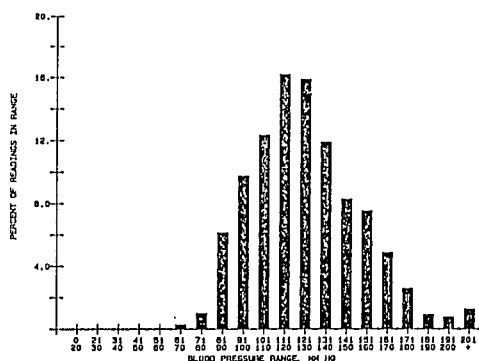


Figure 1. Percentages of total number of systolic blood pressure readings in each blood pressure range.

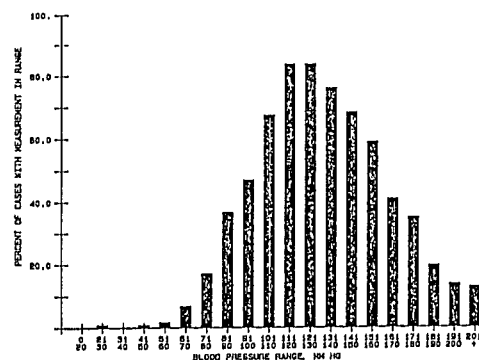


Figure 2. Percentages of the 118 cases with one or more systolic blood pressure readings in each blood pressure range.