viation reinforcing the slow kinetics of the windkessel, with the cardiac parasympathetic system unable to rapidly buffer these surges. Clonidine patients (fig. 3D in our article) shows little lability in pressure linked to a reduced number or amplitude of bursts of sympathetic activity combined with a large sinus arrhythmia at resting pressures.

L. Quintin, M.D., Ph.D.
CHU Nord St. Etienne and Physiologie Faculté de Médecine Lyon, France quintin@univ-lyon1.fr
M. Ghignone, M.D., F.R.C.P.C.
Columbia Hospital West Palm Beach, Florida Torchio@aol.com

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Hemodilution: Fewer Keystrokes, Greater Accuracy

To the Editor—I found the article by Monk et al. a valuable contribution to the transfusion literature, especially because they included timely cost-effectiveness data. I am pleased to see the increasing interest in perioperative acute normovolemic hemodilution, evidenced by recent articles in Anesthesiology and elsewhere. Perioperative acute normovolemic hemodilution can spare many surgical patients exposure to allogeneic blood. Articles discussing hemodilution frequently refer to Gross’s formula for estimating allowable blood loss:

\[
\text{Allowable blood loss} = \text{(Estimated blood volume)} \times \frac{\text{Hct}_{\text{start}} - \text{Hct}_{\text{final}}}{\text{Hct}_{\text{average}}}
\]

This formula was an ingenious approximation to the original formula described in 1974. The original theoretical equation, which has been verified in several clinical studies, involved the solution of a differential equation that resulted in a formula requiring the computation of natural logarithms:

\[
\text{Allowable blood loss} = \text{(Estimated blood volume)} \times \ln \left( \frac{\text{Hct}_{\text{start}}}{\text{Hct}_{\text{final}}} \right)
\]

In 1974, computing natural logs was inconvenient for the practicing clinician. However, now virtually everyone has access to inexpensive, solar-powered, lightweight, hand-held calculators that easily compute natural logs. Therefore, anyone can use the theoretical formula rather than an approximation. And it actually requires fewer keystrokes to compute a more accurate result.

Denis L. Bourke, M.D.
Associate Professor of Anesthesiology
Baltimore Veterans Affairs Medical Center Department of Anesthesiology
University of Maryland at Baltimore
Baltimore, Maryland 21201-1566

References
To the Editor—We read with interest the report by Gallagher1 on the
influence of pacer artifact on the bispectral index (BIS). We wish to
report another situation in which an item of operating room equip-
ment resulted in alteration in the BIS signal.

The patient was a 58-yr-old woman who was anesthetized with
isoflurane, sufentanil, and atracurium for a left partial hepatectomy.
After induction, the BIS (model A1000 v3.12; Aspect Medical Systems,
Natick, MA) was maintained at 60 with electrodes impedances <
1,000Ω. Forced-air warming therapy was performed using an upper-
body blanket (Bair Hugger; Augustine Medical Inc., Eden Prairie, MN).
Just before incision, the BIS was 56. After incision, cautery interrupted
the electroencephalographic signal for a few minutes. When the signal
returned, it showed a marked increase to > 80. However, hemody-
namics were unchanged, and there were no other changes in clinical
signs. On investigation, we noted that the forced air blanket, which
had been turned on simultaneously with the incision, lay directly on
the skin with the warm air blowing on the forehead electrodes.
Turning off the heating unit resulted in a decrease in BIS to < 60 (fig.
1). Each time forced-air warming resumed, the BIS increased. When the
Bair Hugger unit was on but disconnected from the blanket, the BIS
returned to values < 60 (fig. 1). This intervention eliminated any role
for electrical interference caused by the device. We speculate that
vibration of the head wires caused by the air circulation generated an
artifact that was interpreted as a higher BIS value; however, this artifact
was not visible on the raw electroencephalographic trace.

Bispectral index monitoring in the operating room is generally
straightforward, but new medical devices may interfere with it. Knowl-
edge of potential interference from forced-air warming systems must
be taken into account when interpreting BIS.

Bruno Guignard, M.D.
Assistant Professor
Marcel Chauvin, M.D.
Professor of Anesthesiology and Chairman
Department of Anesthesiology
Centre Hospitalier Universitaire Ambroise Paré
Boulogne, France

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