

SHORT COMMUNICATION

Units for Blood Pressure

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Abstract

The unit of mmHg for measurement of blood pressure is outmoded. The SI unit of kPa should be adopted.

Main Body

The first published measurement of blood pressure is credited to Rev Stephen Hales [1] who reported to the Royal Society in 1732 the results of experiments in which he inserted a brass tube into the crural artery of a mare and found that the blood rose in an attached glass tube to a height of 8 feet 3 inches.

Markandu et al [2] reported in 2000 a survey of blood pressure measuring equipment in St Georges Hospital in which they found almost 500 mercury sphygmomanometers, many of which were inaccurate. On that basis, and on the grounds that mercury is a toxic pollutant, they proposed replacement by non-mercury-containing devices, preferably automatic in operation. Their recommendation has been largely adopted in clinical practice. In a letter to The Lancet, MacGregor [3] cited their work, pointed out that mmHg is an anachronistic unit, and considered kPa but preferred cm of blood (cmb) as a more meaningful unit for blood pressure. His proposal does not seem to have borne fruit.

It is indeed apparent with the passing of the mercury sphygmomanometer that mmHg is a unit whose time has passed, just as stones for weight, Fahrenheit for temperature, grains for drugs and mg/100mL for most blood constituents have been superseded. The logical replacement is surely the Système Internationale d'Unités (SI) unit of pressure, the kilopascal, abbreviated kPa. The numbers would be different, just as the numbers changed when the other obsolete units were abandoned. The official conversion factor [4] for mmHg to kPa of 0.1333224 means that 1 kPa is very close to 7.5 mmHg. Current clinicians will adapt to the change just as their predecessors adapted to changes in those other clinical units of measurement, and clinicians newly entering practice will have no difficulty with the new units.

One factor that will ease the change is that the decision points currently accepted for diagnosis of hypertension translate reasonably cleanly into kPa. The 2023 UK NICE guidelines [5] for blood pressure management give decision points in mmHg as a clinic measurement of 140/90 for adults aged under 80 and 150/90 for those aged over 80, translating to home or ambulatory measurement thresholds of 135/85 and 145/85.

These numbers, with kPa given to two decimal places, translate as:

mmHg	kPa
150	20.00
145	19.33
140	18.67
135	18.00
90	12.00
85	11.33

Such precision is probably spurious given the limited accuracy and repeatability of blood pressure measurement, and rounding to one decimal place would be more appropriate.

Many electronic blood pressure measuring devices, including many used for home monitoring, can already provide readout in kPa although they generally default to mmHg because that is the unit widely used in clinical practice.

I suggest that it is time that clinical practice changed. Blood pressure should be measured in kPa.

References

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