DIAGNOSIS

Review: Physical signs are not useful for detecting non–blood-loss hypovolemia

McGee S, Abernethy WB 3d, Simel DL. **Is this patient hypovolemic?** JAMA. 1999 Mar 17;281:1022-9.

Question

In patients with suspected hypovolemia, which physical signs are reliable, accurate indicators of volume depletion or dehydration?

Data sources

Studies were identified by searching MEDLINE (1966 to November 1997) and scanning bibliographies of relevant articles and textbooks on physical diagnosis.

Study selection

English-language studies on the bedside diagnosis of hypovolemia were selected if they involved participants who were ≥ 16 years of age.

Data extraction

Data were extracted on the number of patients, patient age, physical findings, definition of *abnormal finding*, diagnostic standard for hypovolemia, methodologic quality of the study, and sensitivity and specificity for each physical finding.

Main results

4 studies investigated 179 emergency-department patients in whom hypovolemia was suspected because of vomiting, diarrhea, or decreased oral intake. 1 study (n = 32, mean age 44 y) did not use a valid diagnostic standard or unequivocal blinding, 2 studies involved older patients (mean age 81 y), and 1 study involved pregnant women. Sensitivities, specificities, and likelihood ratios for physical signs from the 3 methodologically sound studies are shown in the Table. No physical sign was highly sensitive and specific. Signs with sensitivity > 80% were dry mucous membranes in the mouth and nose and longitudinal furrows on the tongue (Table). Signs with specificity > 80% were postural hypotension, dry axilla, sunken eyes, weakness in an extremity, and unclear or unexpressive speech (Table). No blinded studies of patients with hypovolemia resulting from blood loss were found.

Conclusion

In patients in whom hypovolemia is suspected because of vomiting, diarrhea, or decreased oral intake, no physical sign is highly sensitive and specific.

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Test features of physical signs for detecting non–blood-loss hypovolemia*

Physical findings	Sensitivity	Specificity	+LR	–LR
Pulse increase > 30 beats/min	43%	75%	1.7	0.8
Postural hypotension	29%	81%	1.5	0.9
Dry axilla	50%	82%	2.8	0.6
Dry mucous membranes in mouth and nose	85%	58%	2.0	0.3
Dry tongue	59%	73%	2.1	0.6
Longitudinal furrows on tongue	85%	58%	2.0	0.3
Sunken eyes	62%	82%	3.4	0.5
Confusion	57%	73%	2.1	0.6
Weakness in an extremity	43%	82%	2.3	0.7
Speech unclear or unexpressive	56%	82%	3.1	0.5

*LRs defined in Glossary.

Commentary

This interesting review by McGee and colleagues analyzes the value of isolated physical findings in the assessment of dehydration, hypovolemia, or both. The results are of limited importance in clinical decision making because more information is usually available, including data on patient history of fluid balance and underlying conditions. When an ill patient without an available history is encountered, a prediction rule that uses the full array of available observations would be useful. Such a rule would have to be derived by multivariate analysis from a much larger number of patients than those included in the samples in this review.

The Table in the abstract is derived from 3 studies, each of which involved a defined patient sample. Postural hypotension was studied in pregnant women with hyperemesis (1), and axillary sweating was well quantified in elderly patients (2). All other listed findings were derived from patients ≥ 60 years of age (3). In older adults, alternate explanations usually exist for ≥ 1 of these findings. For example, skin turgor may be reduced by changes in collagen and elastin, the tongue may be dry because of mouth breathing, and eyes may be sunken because of reduced orbital fat.

The presence of multiple findings requires initiation of hydration therapy and simultaneous rapid laboratory and cardiovascular evaluation. In clinical practice, there are 2 immediate diagnostic questions: Is this hypertonic or hypotonic dehydration? Is hypovolemia absolute or related to cardiac failure or faulty distribution of fluids?

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References

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