



Blood Volume Analysis (BVA) Clinical Case Study

Orthostatic Hypotension

History:

This eighty-one year old, 68” height, 196lbs. Caucasian male has a history of atrial fibrillation for seventeen years. He was cardioverted several times to normal sinus rhythm. Eight years ago he developed continuous atrial fibrillation. He has noticed a recent increase in fatigue and shortness of breath. This patient has a familial neuromuscular degenerative condition affecting the lower extremities. He wears bilateral leg braces and uses crutch canes for ambulation. Over the past three years he has developed increased unsteadiness of gait. This has resulted in several falls. Patient however has had symptoms suggestive of orthostatic hypotension. His blood pressure is 125/63. Over the past year he has noted an increase in edema of the lower extremities. This edema is has been treated with daily use of a diuretic. The patient has atrial fibrillation at 70-90 without digoxin therapy. Patient has inquired about the possible use of Viagra.

BVA Results:

Blood Vol.	4135cc	Ideal Blood Vol.	5060cc	Deficit	925cc	Devtn.	-18.3%
Red Cell Vol.	1695cc	Ideal Red Cell Vol.	2052cc	Deficit	356cc	Devtn.	-17.4%
Plasma Vol.	2440cc	Ideal Plasma Vol.	3009cc	Deficit	568cc	Devtn.	-18.9%

Normal
0 to 8%

Mild
8 to 16%

Moderate
16 to 24%

Severe
24 to 32%

Extreme
>32%

Hematocrit: 43%

Clinical Findings:

This patient has mild to moderate hypovolemia and a similar red cell volume deficit. This volume deficit is most likely due to daily diuretic use. This patient does not have an expanded blood volume. Additional history has indicated a ten-pound weight gain over the past year, which may be the reason for the increase in fatigue and shortness of breath. Although the patient does not present with orthostatic hypotension, he does have significant blood volume deficit and may have intermittent hypotension. His diuretic therapy should be reduced to alternate days and be permitted to have a modest amount of edema as a trade-off in attempting to correct his decreased blood volume. The finding of a significant low blood volume suggests that the lower extremity edema in this case is related to neuromuscular changes and poor venous return rather than congestive heart failure. The use of Viagra in combination with low blood volume would place this patient at an increased risk of a cardiovascular event. It should be noted that Viagra has a twenty-four hour effect and may potentiate an orthostatic hypotension effect in a patient with low blood volume. The full extent of this patient’s anemia is masked by his hypovolemia.

Technical Analysis:

Technical analysis consists of an evaluation of five separate blood volume collection points with mathematical evaluation of consistency. Technical evaluation is reported as acceptable or unacceptable.

All five individual sampling points, tested in duplicate, were internally consistent with no significant deviations. The standard deviation was less than 2%. The slope was 0.00227 and is normal. Therefore, the results are technically acceptable.