GUIDANCE FOR MANAGING PATIENTS USING POCT RESULTS

POCT-BSPS-DOC-2

APPENDIX 2: D-dimer: Radiometer AQT90 Flex.

When using D-dimer for investigation of venous thromboembolism (VTE) in emergency departments using the POCT machine (Radiometer AQT90) please remember:

1. **Use a NICE[1]-aligned pathway, including use of Wells score for clinical assessment and to determine the need for D-dimer testing[3].**

NICE NG158, for DVT (deep vein thrombosis) or PE (pulmonary embolism), or local trust pathways.

D-dimer should not be used in patients with high clinical probability of PE, or in isolation for the rule-out of high probability DVT[1,3,4].

POCT Radiometer AQT90 D-dimer is fully quantitative (produces numerical results), as per NICE recommendations.

2. **The appropriate, age-related cut-off must be used for interpreting D-dimer[1,2,4].**
    - Less than 500 ng/mL (<500ng/mL) is normal in patients aged 50 years or younger.
    - In patients aged over 50 years, the cut-off is = age (years) x 10 ng/mL e.g., for a patient aged 63 years;

      63 years x 10 = 630 ng/mL cut-off for VTE rule-out.

Using the 500ng/mL cut-off in older patients may increase the likelihood of false positive interpretation, and unnecessary further testing / scanning / interim anticoagulation.

The age-adjusted clinical decision limit is now applied to the result report in the EPR (Epic/Cerner) for POCT D-dimer, but the analyser still displays the 500ng/mL limit for all tests.

3. **Do not duplicate testing between POCT and the lab** – just use the POCT D-dimer test. This will save time and money, and reduce clinician confusion in trying to make decisions on discrepant results, which is expected due to lack of standardisation of D-dimer methods. It will also improve patient safety by reducing unnecessary interim anticoagulation and referral for scanning.

4. If a **POCT D-dimer result is in doubt,**

    - if the sample was taken within the last 3h, mix and rerun immediately.
    - if the sample is too old, or the rerun result very different from the first result, take a new sample for POCT D-dimer
    - inform the clinician in charge of the care of the affected patient - nurse or medic.
    - if the 2nd result is very discrepant from the original, inform the POCT team to investigate.
    - Do not take the analyser out of use unless there is a pattern of suspicious results, in which case contact your local POCT team.

These recommendations are based on evidence of the AQT90 POCT D-dimer clinical performance at Frimley Park and Royal Surrey. We examined over 100 pairs of results from the current POCT method and laboratory method against clinical findings, including scanning[5,6,7]. We found:

- For both lab and POCT, the negative predictive value for VTE of a result below the age-related cut-off is >99% in appropriately selected patients.
- The POCT D-dimer compares better to clinical findings than the laboratory test.
- For D-dimer testing to rule-out VTE, the clinical specificity for POCT is 66%, and lab is 51%.
- The laboratory D-dimer test is more likely to give a false positive result than the POCT D-dimer test.
- There were several instances where both POCT and lab results were found to be raised above the threshold - these results are deemed to be true, non-specific, physiological increases in D-dimer. See list below for some of the conditions known to be associated with increased circulating D-dimer.
- POCT and laboratory D-dimer tests do not compare well numerically – this is expected due to the nature of the testing methodology. It is not appropriate to compare results from 2 different methods for this test.

D-dimer sample type

Venous blood must be collected into a vacuum collection tube and mixed well by inversion.

Site	**Sample type***
FPH, WPH, ASPH, RBH, RSFT	Green-top lithium heparin
SASH	Purple-top EDTA

*Subject to review at time of publication

Clotted specimens (the blood appears like jelly in the tube) will give false positive D-Dimer results.

D-dimer tests – background.

D-dimer tests are not standardised – there is no standard reference test procedure or reference material against which to calibrate tests. Different manufacturers and tests use different designs and antibodies in these immunoassays, and can calibrate to either DDU (D-dimer units) or FEU (fibrin equivalent units), as well as using many different units of measurement. **POCT has aligned with the lab to use ng/mL and FEU-traceable result with the same cut-off for VTE (see above).** Even so, our work has shown that the POCT and lab assays do not compare numerically, and rarely there are also clinical discrepancies.

Non-VTE elevations in D-dimer.

D-dimer is raised in the following conditions:

- Pregnancy
- Active infection
- COVID-19 disease
- Malignancy
- Inflammatory conditions
- Post-op
- Peripheral vascular disease
- Acute kidney injury
- Hospitalised patients
- Age – see above re the need for age-adjusted cut-offs in patients >50 years.

The table below lists more non-VTE causes of a raised D-dimer (taken from Favresse *et al*[8]).

Acute respiratory distress syndrome	Disseminated intravascular coagulation	Pancreatitis
Advance age	Heart failure	Post transplantation complications
Alzheimer	HELLP syndrome	Pregnancy or puerperium
Aneurysm	Hemolysis (falciform anemia)	Recent surgery
Aortic dissection	Hemorrhage	Renal disease
Arthritis	Hospitalization	Severe chronic urticaria
Atrial fibrillation	Inflammatory bowel disease	Thrombolytic therapy
Burns	Ischemic cardiopathy	Trauma
Cancer	Liver disease	Venous or arterial thrombosis
Chronic inflammation	Localized or systemic Infection	
Disability	Neonatal period	

Clinical probability scoring

In suspected DVT or PE, use the Wells Score as per NICE NG158 to assess clinical probability and the need for a D-dimer test, or other clinical actions to take.

The Wells score must be available before proceeding to testing, and can be entered into the machine for recording in the patient record alongside the result.

D-dimer is only useful for ruling out VTE in patients with non-high Wells scores.

A negative D-dimer does not exclude DVT/PE in the presence of a moderate or high Wells score – i.e., the negative predictive value is decreased.

Confounding factors for D-dimer interpretation

- Anticoagulation therapy reduces D-dimer concentration. Repeat testing during / after recent therapy is not recommended for VTE assessment. If required for further assessment of risk, or investigation of other conditions, interpret with caution.
- In sickle cell disease higher D-dimer levels can be associated with vaso-occlusive crises and morbidity eg stroke, retinopathy.
- In sickle cell trait (carriers), D-dimer averages ~200ng/mL higher (median) than race-matched non-carriers[9].
- Nystatin (antifungal drug, also known as Nystan) may interfere with the POCT D-dimer test.
- Results from the analyser cannot currently indicate whether they are outside of the measuring range, so a result of 80ng/mL could be less than 80ng/mL, and a result of 100 000ng/mL could be greater than 100 000ng/mL. We consider the clinical impact of this to be minimal in the measurement of D-dimer in VTE.

References

1. NICE NG158 Venous thromboembolic diseases: diagnosis, management and thrombophilia testing. Last updated August 2023.
2. Gardiner *et al.* International Council for Standardization in Haematology (ICSH) laboratory guidance for the verification of haemostasis analyser-reagent test systems. Part 2: Specialist tests and calibrated assays. Int J Lab Hematol. 2021;43:907–916.
3. British Thoracic Society guidelines for the management of suspected acute pulmonary embolism. Thorax 2003;58:470–484
4. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society. Eur Respir J 2019; 54: 1901647
5. Phillips B *et al.* Clinical concordance of AQT90 Flex point of care D-dimer measurement versus 2 laboratory methods. Proceedings of the British Society of Haematology Annual Scientific Meeting 2023.
6. Riddoch F *et al.* D-dimer; understanding pitfalls in comparing POCT and laboratory methods. IBMS 2023
7. Riddoch F *et al.* The dangers of duplicating D-dimer testing a case of patient harm and clinical confusion. LabMedUK24
8. Favresse J *et al.* D-dimer: Preanalytical, analytical, postanalytical variables, and clinical applications. CRITICAL REVIEWS IN CLINICAL LABORATORY SCIENCES 2018; 55, 8
9. Naik RP *et al.* Elevated D-dimer levels in African Americans with sickle cell trait. BLOOD (2016), 127 (18); 2251-2253.

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January 2026