

Background Acute headache is a common reason for presentation to emergency departments. Some have significant structural pathology requiring further intervention. Emergency clinicians often rely on presenting headache features (such as thunderclap onset) to guide the need for neuroimaging and further investigation. It is unclear whether these features discriminate accurately or how the investigations of patients presenting with thunderclap headache differs internationally.

Objectives To determine the proportion of patients presenting with thunderclap onset of headache from a general headache cohort and compare demographics, investigation strategy and final diagnosis, across an international sample of patients.

Methods An international, multicentre, observational prospective cohort study. This planned sub-study focussed on patients presenting with thunderclap onset headache, with characteristics compared to the general headache cohort. The prospective observational design was chosen to capture real-world data on current international practice.

Results The study recruited 4536 patients across 67 hospitals and 10 countries during 2019. Of this, 644 patients presented with thunderclap headache onset (14.2%). Median age was 44. The majority of patients self-referred to hospital. CT brain imaging was performed in 62.7% cases and lumbar puncture in 10.6%, with wide international variation. New Zealand reported the highest rate of neuroimaging, 78.4% of patients presenting with thunderclap headache, compared to 25.0% in Romania. All cases of subarachnoid haemorrhage (SAH) were diagnosed on CT imaging results.

When compared with the parent cohort of all headache patients presenting to the ED, those with thunderclap headache had a significantly higher rate of serious cranial pathology (13.7% vs 8.5%, $p < 0.001$) and final diagnosis of SAH (3.6% vs 0.8% $p < 0.001$).

Conclusions Thunderclap headache presenting to the ED appears to correlate with a higher risk for serious intracranial pathology and/or SAH. Investigation strategies varied within this international cohort. Neuroimaging rates did not align with international guidelines, suggesting potential for further work on standardisation.

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CHARACTERISTICS OF PATIENTS WITH COVID-19 UNDERGOING CT PULMONARY ANGIOGRAPHY IN THE EMERGENCY DEPARTMENT: A RETROSPECTIVE OBSERVATIONAL STUDY

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Aims/Objectives/Background The shared features of pulmonary embolism (PE) and COVID-19 create a diagnostic challenge for Emergency Departments. Raised D-dimer and CRP are predictive of PE, critical illness and mortality from COVID-19, however guidelines state there is insufficient evidence to recommend that biomarkers be used to guide practice to diagnose PE. This retrospective observational study analyses characteristics and biomarkers of patients with COVID-19 undergoing CT pulmonary angiography (CTPA) in the Emergency Department. The aim is to establish whether there is a role for D-dimer, CRP and Wells' score to risk stratify

patients with COVID-19 to guide CTPA imaging and enable early diagnosis of PE.

Methods/Design CTPA scans requested by two London Emergency Departments in April 2020, December 2020-February 2021 were identified. **Inclusion:** COVID-19 positive by PCR or radiographic appearances. Patient records screened to identify: gender, age, days since symptom onset, D-dimer and CRP. **Exclusion:** >30 days symptoms, chronic PE, already receiving anticoagulation or insufficient data. Wells' scores calculated for patients diagnosed with PE.

Results/Conclusions 468 patients were included, with 47 diagnosed with PE on CTPA (prevalence=10%). D-dimer (ng/ml) is significantly higher in patients with PE compared to no PE (median 6154; IQR 2455-12092 v med 1221; IQR 787-2350, $p < 0.05$). Odds ratio for PE with D-dimer ≥ 1000 compared to D-dimer $< 1000 = 26.8$ (95% confidence interval: 3.66–196.29). Diagnostic testing: sensitivity 97.87%, specificity 36.82%, PPV 14.74%, NPV 99.36%. Mean Wells' score in patients with PE=4 (3–7.5), with 53% ($n=25$) having a Wells' score of 4 or less ('PE unlikely').

D-dimer has a strong NPV for PE at values less than 1000ng/ml in the COVID-19 population, and therefore may have a role in ruling out PE and reducing CTPA scans in the Emergency Department. The Wells' criteria, if used according to NICE guidance, would not indicate CTPA and potentially lead to delayed diagnosis in this patient group.

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CHANGING NATURE OF MAJOR TRAUMA FROM 2000 TO 2019 IN ENGLAND AND WALES: OBSERVATIONAL REGISTRY STUDY

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Aims/Objectives/Background Low energy transfer mechanisms – predominately falls from a standing height – have been identified as the most prevalent cause of major trauma in higher-income countries. This study examines the epidemiological trends in major trauma in England and Wales between 2000 – 2019, incorporating changes in mechanism of injury, imaging practices, case ascertainment and national demographic shifts. In addition, changes in the whole cohort of major trauma patients and differences between patients who suffered high energy and low energy mechanism of injury are described.

Methods/Design A retrospective observational cohort study was conducted using Trauma Audit and Research Network (TARN) data. Patients with an injury severity score (ISS) > 15 admitted to hospital in England and Wales between 1 January 2000 to 31 December 2019 were included. The primary outcome was the temporal trend in the proportion of major trauma sustained through low energy transfer, and its association with imaging practices, case ascertainment and demographic changes.

Results/Conclusions 241,484 participants were included in the analysis, of which 96,833 were classified as low energy. Low energy trauma accounted for 12.5% in 2000 ($n = 373$), rising