

probability assessed and documented. The Norfolk and Norwich University Hospital (NNUH) uses the Wells PE score. Validation studies have shown it to be a sensitive tool with a positive predictive value of: low risk (5%), medium risk (25%), and high risk (70%) respectively.

We wanted to assess the correlation of the Wells PE score with PE positivity rates on CT Pulmonary Angiogram (CTPA) in our patient population. We anticipated similar positive predictive rates as those seen in the original validation studies.

**Methods** We retrospectively collected data from CTPA requests submitted between October 2009 to September 2010. The Wells PE score was used to risk stratify patients into low (score < 2), moderate (score 2–6), or high risk (score > 6). These were correlated with the outcome of the CTPAs. We also used the alternate dichotomised Wells PE score of PE Unlikely (score ≤ 4) and PE likely group (score > 4) and correlated with results.

**Results** 1160 CTPA requests were identified, 66 were excluded, (they lacked a wells PE score). 1094 CTPA requests were analysed.

**Conclusion** We found poor correlation between the pre-test probability score and confirmed PE;

**Results** show a positive predictive value of low risk (21.4%), medium risk (22.1%) and high risk (35.3%). The dichotomised score showed PE Unlikely (19.1%) and PE Likely (27.4%). Analysis of the Wells PE variables revealed that they lacked a high specificity and high sensitivity, the subjective variable demonstrated the lowest specificity.

The Wells PE score is not an effective pre-test probability tool for discriminating low, moderate and high risk groups in the patient population at NNUH

#### Reference

1. Wells PS, Anderson DR, Rodger M, et al. Derivation of a simple clinical model to categorise patients probability of pulmonary embolism: Increasing the models utility with the SimpliRED D-dimer. *Thrombosis and Haemastasis*. 2000; 83 (3): 416–420.

#### Abstract P147 Table 1

	CTPAs	+ ve for PE	-ve for PE	Positivity rate
Total	1094	278	816	25.4%
Low risk	56	12	44	21.4%
Medium risk	763	169	594	22.1%
High risk	275	97	178	35.3%
<4 PE unlikely	261	50	211	19.1%
>4 PE likely	833	228	605	27.4%

#### P148 THE LIES WE TELL – PRE-TEST PROBABILITY IS ONLY USEFUL AT RISK STRATIFYING PULMONARY EMBOLI WHEN USED ACCURATELY

doi:10.1136/thoraxjnl-2012-202678.431

M Newnham, H Stone, S Salehi-Bird, R Summerfield, N Mustfa. *University Hospital of North Staffordshire, Stoke-on-Trent, United Kingdom*

**Introduction** Pre-test probability (PTP) scores are widely used to risk stratify pulmonary emboli (PE). A multitude of scores exist; however diagnosing PE remains challenging. We aim to identify whether patients were correctly PTP scored and what effect rescoring with the correct information has on predicting PE. We will identify the effect different PTP scores have on the likelihood of PE.

**Methods** We conducted a retrospective study of inpatient computer tomography pulmonary angiograms (CTPA) within a large teaching hospital over a 1-year period. We recorded the originally submitted PTP score (modified Wells score), D-Dimer result and the CTPA outcome (PE-positive or negative cohorts). The accuracy of the PTP score was assessed from the original clinical information; rescoring when appropriate. We also rescored using alternative PTP

systems (Geneva and simplified BTS). We analysed whether any factor or PTP scores could predict the presence of PE.

**Results** 202 CTPAs were performed (70, 35% PE positive; 131, 65% PE negative). Baseline characteristics did not differ (age, gender, requesting team, inflammatory markers, mortality). PE was more likely with a higher D-dimer (682 vs. 853;  $p<0.001$ ); pneumonia occurred more frequently in the PE-negative cohort (61 vs. 12;  $p<0.001$ ). A third of forms were scored incorrectly; occurring significantly more in the PE-negative cohort ( $p=0.001$ ). There was no difference between the original PTP scores (3.7 vs. 3.8;  $p=0.631$ ); however when rescored with the correct clinical information, the PE-positive cohort had a significantly higher PTP score (2.0 vs. 3.1;  $p=0.001$ ) (Table 1). Geneva score did not accurately predict PE (2.3 vs. 2.5;  $p=0.25$ ); whereas the simplified BTS score did (0.9 vs. 1.3;  $p<0.001$ ).

**Conclusions** Patients without a PE were significantly more likely to have an incorrect PTP score. Clinicians may have poor concordance with scoring to meet CTPA requesting criteria. The originally calculated PTP score was not predictive of PE. However, when scores were adjusted with the correct information, a higher PTP score was predictive of PE. Simple PTP scoring systems performed well compared with more complex versions. PTP scores are only effective at predicting PE when used accurately; this may not occur in practise.

#### Abstract P148 Table 1 PTP scores in negative and positive PE cohorts and the statistical significance between them

PTP Score	PE -ve	PE +ve	p-value
Wells – original	3.7	3.8	0.631
Wells – rescore	2.0	3.1	0.001
Geneva	2.3	2.5	0.250
Simplified BTS	0.9	1.3	<0.001

#### P149 MANAGEMENT ALGORITHM FOR PULMONARY EMBOLISM (PE) WITH RIGHT HEART STRAIN: A CASE SERIES

doi:10.1136/thoraxjnl-2012-202678.432

V Smith, G Tunnicliffe, G Fiorino, A Draper, I Vlahos, M Shannon, BP Madden. *St George's Hospital, London, UK*

Current guidelines state thrombolysis is first line therapy in hypotensive PE patients and may be of benefit in normotensive patients with right heart strain. There is, however, no specific guidance on selecting these patients.

In 2010, St George's Hospital, under the guidance of a multidisciplinary team of specialists, initiated an algorithm for the management of patients with massive PE. The aim of this study was to determine whether the algorithm is an effective means of assessing a series of nine patients who received thrombolytic therapy over a two year period.

The age range of the patients was 36–81 years, 5 were male. 5 patients had identifiable thromboembolic risk factors: pregnancy and protein S deficiency (1), recent lower limb surgery (2), new cancer diagnosis (1) and chronic immobility (1). All 9 patients had a computed tomography pulmonary angiogram (CTPA) confirming large proximal PEs with elevated troponin I and NT-pro-BNP levels at diagnosis. Right heart strain was demonstrated on echocardiogram in five patients with evidence of intracardiac thrombus in two. The remaining patients had right heart strain demonstrated by CTPA. The indications for thrombolysis were cardiac arrest (1), hypotension (1), intracardiac thrombus (2) and significant right ventricular strain(5). There was one mortality within this cohort following retroperitoneal bleed. This patient underwent an echocardiogram 5 days post thrombolysis revealing severely dilated right heart and RVSP of 61mmHg. Patients achieved good resolution of thrombus on repeat CTPA, and no evidence of right heart strain on follow up echocardiogram.

The majority of these patients had improved right ventricular function post thrombolysis. This small cohort study demonstrates the variability in the clinical presentations and physiological manifestations of massive PE, hence the need for early specialist input. The algorithm is an effective tool in identifying high mortality risk patients and those likely to develop pulmonary hypertension, thus allowing early specialist review and intervention.

## Cough measurement, mechanisms and treatment

### P150 THE DEVELOPMENT OF A COUGH HYPERSENSITIVITY QUESTIONNAIRE (CHQ)

doi:10.1136/thoraxjnl-2012-202678.211

<sup>1</sup>J La-Crette, <sup>1</sup>KK Lee, <sup>1</sup>S Chamberlain, <sup>2</sup>J Saito, <sup>2</sup>J Hull, <sup>2</sup>KF Chung, <sup>1</sup>SS Birring. <sup>1</sup>King's College London, London, UK; <sup>2</sup>Imperial College London, London, UK

**Introduction and objectives** Cough reflex hypersensitivity (CRH) is a key feature of most patients with a refractory chronic cough and has distinct clinical features of hypertussia, allotussia (cough due to nontussive stimuli e.g. talking) and laryngeal paraesthesia (throat tickle). Cough challenge tests, the gold standard used to identify CRH, are limited for clinical use because of the wide overlap between healthy subjects and chronic cough. We aimed to develop a patient reported cough hypersensitivity questionnaire (CHQ) to identify abnormal CRH symptoms and evaluated it in subjects with and without cough.

**Methods** The CHQ was developed following literature review, MDM and patient interviews. It assessed the presence and severity of cough triggers and laryngeal sensations on a Likert scale. It contained 35 items, score range 0–150. 38 Subjects (16 healthy, 10 refractory chronic cough (RCC: rhinitis, gastro-oesophageal reflux

disease, asthma/eosinophilic bronchitis) and 12 respiratory disease (RD: bronchiectasis, sarcoidosis, interstitial lung disease and emphysema) with cough) completed the CHQ, LCQ (health status), capsaicin cough reflex sensitivity (C5) and urge to cough VAS during capsaicin test.

**Results** Capsaicin cough reflex sensitivity, compared to healthy subjects, was increased in both RCC (geometric mean(logSD) C5 for RCC 18.1 (1.1) vs Normal 134.3 (0.8)  $p=0.0084$ ) and RD ( $p=0.0126$ ); figure 1. CHQ scores were raised in RCC compared to healthy subjects ( $p=0.0001$ ) and RD ( $p=0.0068$ ), figure 1. The upper limit of normal for CHQ score was 46. CHQ identified subjects with RCC better than C5. There was no significant relationship between CHQ and age or gender. CHQ was associated with logC5 (all subjects)  $r=-0.33$ ,  $p=0.045$  and health status (LCQ in RCC and RD)  $r=-0.58$ ,  $p=0.006$ . There were no significant differences in mean(SD) urge to cough VAS during capsaicin test between subjects; healthy 52(25), RCC 39(24) and RD 54(29);  $p=0.2317$ .

**Conclusion** In conclusion, this preliminary study suggests that laryngeal sensations and cough triggers assessed with the CHQ may identify patients with CRH. Further work is needed to repeat the study in a larger number of subjects, investigate whether the number of CHQ items could be reduced and to develop better objective tests of CRH.

### P151 LARYNGOPHARYNGEAL PEPSIN REFLUX IN PATIENTS WITH UPPER AIRWAY SYMPTOMS

doi:10.1136/thoraxjnl-2012-202678.212

A Spyridoulas, S Lillie, A Vyas, SJ Fowler. Lancashire Teaching Hospitals NHS Foundation Trust, Preston, UK

**Background** Laryngopharyngeal reflux (LPR) is implicated in inducing laryngeal hyper-responsiveness which is a unifying feature underlying chronic cough and vocal cord dysfunction. A lack of response to standard anti-reflux therapy in patients with LPR may

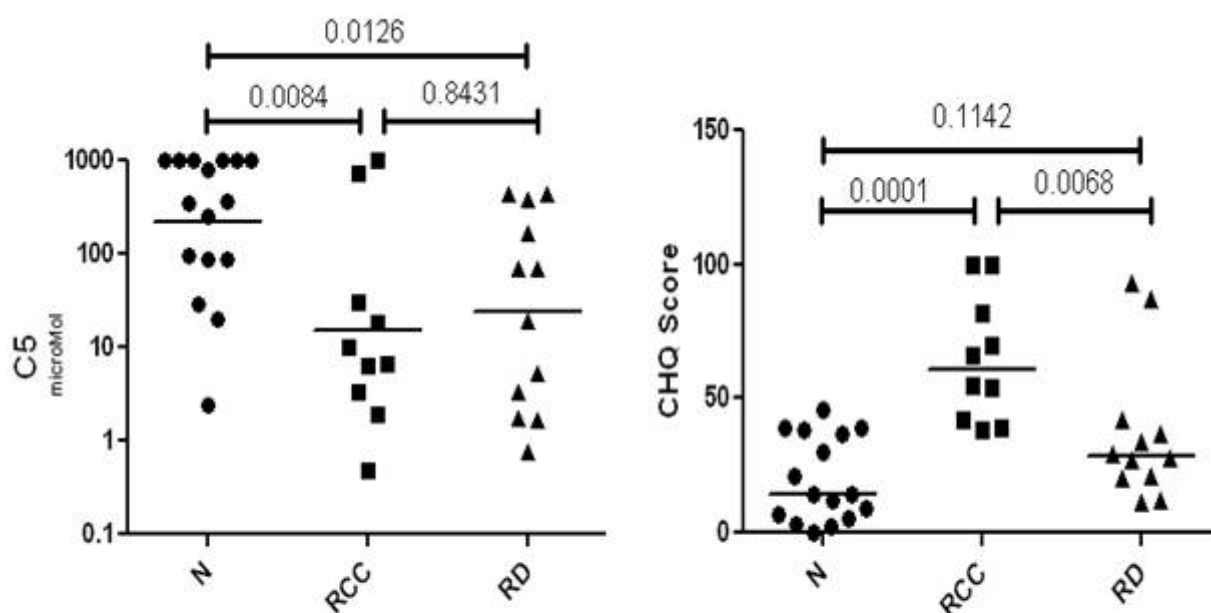


Figure 1. Objective and subjective assessment of cough reflex hypersensitivity. C5: capsaicin cough reflex sensitivity; CHQ: cough hypersensitivity questionnaire; N: normal; RCC: refractory chronic cough; RD respiratory disease.

Abstract P150 Figure 1