

Conclusion Ethnic differences in lung volumes exist and cannot be accounted for by a simple correction factor. Current paediatric plethysmographic reference equations are not appropriate, and may lead to misdiagnosis unless limits of normality are adjusted. Caution in interpretation is recommended until more appropriate reference equations can be developed. This requires prospective plethysmographic lung volume data collection using standardised protocols in children from different ethnic backgrounds.

REFERENCES

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P138 EVALUATION OF THE NEED FOR A COMPREHENSIVE ASSESSMENT OF LUNG FUNCTION PRE OPERATIVELY IN THE MORBIDLY OBESE

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Introduction and Objectives Chronic morbid obesity has been shown to impinge on normal respiratory function and can ultimately result in respiratory failure. Lee *et al* (2010) concluded that a more physiological assessment of individuals in this group is required when they are investigated clinically. Accordingly, the clinical pathway of patients referred for bariatric surgery at York Hospital was changed to include comprehensive Pulmonary Function Tests (PFT's), as well as the current standard Overnight Pulse Oximetry. The objective was to evaluate the revised clinical service and distinguish if the additional measurements are appropriate for morbidly obese patients as part of their surgical pre-assessment.

Methods Data were collected from patients undergoing bariatric pre-surgical assessment, between January 2011 and June 2011. PFT's undertaken included dynamic lung volumes, static lung volumes and transfer factor for carbon monoxide (TL_{CO}), using a Medgraphics Plethysmograph system in accordance with recognised standards. Overnight oximetry was performed using Minolta 300i pulse oximeters. Abnormalities of lung function were determined using the BTS (1997) guidelines. Obstructive sleep apnoea (OSA) was diagnosed using the Scottish Intercollegiate Guidelines Network, (2003) guidelines.

Results A total of 59 patients were included in the study with demographics and measurements summarised in Abstract P138

table 1. 28.8% had normal lung function and no evidence of OSA, 39% had evidence of OSA but normal lung function. 6.8% had abnormal lung function but no OSA and 25.4% had both abnormal lung function and evidence of OSA.

Conclusions Va and FRC_{Pleth} are reduced in all groups but is more significant in both groups with abnormal lung function. Those with combined abnormalities are on average 14.8 and 6 years older than those with no abnormalities or just OSA respectively suggesting the development of these co-morbidities with age. We feel that the finding that 32.2% of bariatric referrals were found to have abnormal lung function justifies the inclusion of these measurements when assessing this category of patient. Also, further assessment following weight loss in order to establish the underlying nature of deficient lung function would be useful.

P139 THE USE OF VENTURI MASKS WITH OXYGEN CONCENTRATORS

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Background Venturi masks are commonly used in the hospital setting to deliver controlled percentages of oxygen. This is important for those at risk of hypercapnic respiratory failure and to accurately assess ventilation and gas exchange. Hospital oxygen supplies deliver high velocity and pressure, which are required for Venturi masks to operate as designed. Home oxygen is commonly delivered via concentrators, which work at lower pressures and this may affect the performance of Venturi masks if they are requested for home use.

Aim We aimed to review the oxygen delivered by the concentrator and the performance of Venturi barrels (24%, 28% 31% and 35%) with the Intensity concentrator at the usual flow rates used.

Methods Venturi barrels from the three manufacturers were tested using a TSI® Certifier® FA Test system, pressure gauge, flow metre and oxygen sensor. The Intensity concentrator was set at the specified flow rate and allowed to stabilise, oxygen concentration and outlet pressure were noted. We attached the Venturi barrels and recorded the flow rate, back pressure and delivered oxygen concentration. If the Venturi under performed we adjusted the concentrator to deliver the stated FiO₂ and noted the flow rate required.

Results The concentrator delivered between 95.8 % and 84.7% oxygen, with concentration reducing at higher flows (see Abstract

Abstract P138 table 1 Summary of demographic and respiratory data for pre bariatric surgery patients

	All subjects n=59	Abnormal PFT's n=4	OSA n=23	Abnormal PFT's & OSA n=15	No abnormalities n=17
Males	n=21	n=2	n=9	n=7	n=3
Females	n=38	n=2	n=14	n=8	n=14
Age (yrs)	44.5±11.37	38.8±16.76	46.0±6.39	52±9.79	37.2±12.44
BMI (Kg/m ²)	48.2±7.40	43.3±5.56	48.6±7.79	47.2±8.61	49.9±5.90
SpO ₂ (%)	96.7±3.36	97.8±1.50	96.3±4.52	95.8±3.10	97.6±1.32
Spirometry	Normal=47	Normal=3	Normal=23	Normal=5	Normal=17
Pattern	Obstructive=4 Restrictive=8	Obstructive=0 Restrictive=1	Obstructive=0 Restrictive=0	Obstructive=3 Restrictive=7	Obstructive=0 Restrictive=0
FVC (%pred)	96.05±16.27	86.25±4.76	103.83±10.89	75.80±7.88	105.71±11.94
FRC _{pleth} (%pred)	76.50±16.76	67.00±22.73	82.14±15.37	75.85±22.24	71.94±10.80
TL _{CO} (%pred)	100.34±14.49	89.50±17.33	104.65±13.76	94.33±15.00	102.35±12.37
V _A (%pred)	89.00±13.45	78.75±5.12	94.61±10.95	75.40±10.08	95.82±10.14
K _{CO} (%pred)	113.75±18.94	112.50±20.42	110.83±13.74	126.07±22.77	107.12±17.53

Data presented as n or mean±SD.

PFT's, pulmonary function tests; OSA, obstructive sleep apnoea; BMI, body mass index; SpO₂, saturation of peripheral oxygen; FVC, forced vital capacity; % pred, percent predicted; FRC_{pleth}, functional residual capacity measured by plethysmography; TL_{CO}, Transfer factor of the lung for carbon monoxide; V_A, alveolar volume; K_{CO}, Transfer coefficient of carbon monoxide.

P139 table 1). Most Venturi barrels delivered a lower FiO₂ than intended. Those closest to the desired FiO₂ were designed to work at higher flow rates. The 24% Venturi barrels caused significant back pressure which reduced delivered FiO₂ and caused the concentrator to alarm.

Abstract P139 Table 1 Venturi performance with home oxygen concentrator

Venturi %	Flow rate	Oxygen concentration	Concentrator outlet pressure (psig) and back pressure	Oxygen concentration post Venturi %	
Intersurgical Venturi barrels					
24	2	94.0	19.4	7.0	22.8
28	4	94.1	19.4	0.6	26.0
31	6	95.8	19.4	0.3	28.7
35	8	84.7	19.4	0.2	33.2
Salter labs Venturi barrels					
24	4	94.1	19.4	12.0	23.7
28	4	94.1	19.4	0.9	26.0
31	6	95.8	19.4	0.6	28.0
35	8	84.7	19.4	0.4	30.5
Respironics					
24	3	94.5	19.4	1.50	22.0
28	6	95.8	19.4	0.5	27.2
35	10*	95.0	19.4	0.3	36.9

*In order to deliver 10 l flow rate 2 Intensity concentrators were used.

Conclusions Venturi barrels used with oxygen concentrators in the home are likely to deliver a lower oxygen concentration than expected and are unlikely to lead to hypercapnic respiratory failure. For a controlled FiO₂ to be delivered, the chosen concentrator and Venturi need to be tested so flow rate can be set accordingly but concentrators alarm systems may prevent practical use.

Pulmonary rehabilitation: a challenging exercise?

P140 UPTAKE AND COMPLETION OF PULMONARY REHABILITATION: THE INFLUENCE OF REFERRAL SOURCE

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Background Pulmonary rehabilitation (PR) leads to significant improvements in exercise capacity, health status and dyspnoea in patients with chronic respiratory disease, supported by a strong evidence base. Despite the known benefits of PR, a proportion of referred patients never attend while others fail to complete the programme. The doctor-patient relationship is complex and may influence uptake and adherence to therapy. We hypothesised that uptake and completion of PR would be greater in patients referred from a senior doctor (hospital consultant or GP) compared with those referred by junior doctors or allied health professionals.

Methods 466 consecutive referrals to the Pulmonary Rehabilitation (PR) programme were divided according to referral source: Senior Doctor (Hospital consultant or GP), Junior Doctor (Any trainee doctor from hospital or primary care) and Allied Health Professional (AHP: typically community/practice nurses or hospital physiotherapists). Uptake (proportion of referrals that start PR), and completion (proportion of patients that attended more than 8 PR sessions and the post-course assessment) were calculated for each referral source and compared using χ^2 test.

Results Overall uptake and completion rates were 78% and 75% respectively (raw data Abstract P140 table 1). Uptake was significantly greater in referrals from Senior Doctor compared with Junior Doctor or AHP (82% vs 67% and 74% respectively; χ^2 p=0.02), although no significant difference was seen in completion (77% vs 70% and 68%; χ^2 p=0.25). Abstract P140 table 1 shows the raw data. There was no significant difference in baseline patient characteristics between the referral sources (age, FEV₁%, MRC dyspnoea score, Hospital Anxiety and Depression score, incremental shuttle walk distance, Chronic Respiratory Disease Questionnaire, Lung Information Needs Questionnaire or COPD Assessment Test).

Abstract P140 Table 1

Referrer	Referrals	Uptake	Completers
Senior doctor	318	260	200
Junior doctor	64	43	30
Allied health professional	84	62	42
Total	466	365	272

Conclusion There is increased uptake of PR in patients referred by a hospital consultant or GP than if referred by a junior doctor or AHP. Further work is required to explore the reasons for this observation.

P141 UNWARRANTED VARIATION IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE CARE: PROVISION OF PULMONARY REHABILITATION FOR LONDONERS

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Introduction and Objectives Pulmonary Rehabilitation (PR) is recognised as an essential component of care for patients with chronic obstructive pulmonary disease (COPD). However there is no national database of available or delivered PR services. The aim of this study was to identify and characterise PR services and service variation for a 7.75 million population in one Health Authority with 31 Primary Care Trusts (PCTs).

Methods PR leads in each PCT were identified and a telephone interview conducted using 52 clinical and service related questions including estimated annual referrals, rolling/cohort model, sessions/week, PR duration, assessment (duration, exercise capacity (Incremental Shuttle Walk (ISW), 6 min Walk Test (6MWT)) and quality of life (QOL) measures), psychologist involvement, completion measures and availability of post PR-maintenance programmes. Provision of PR was compared to quality outcomes framework (QOF) prevalence of diagnosed COPD.

Results 26/31 (84%) PCTs provide PR (74 programmes) from 32 service providers; 5 PCTs provide no PR. Provision was not related to COPD prevalence; the range of service referrals received was <50 to >700/year. 15/26 (58%) PCTs offered maintenance programmes. 52 programmes were rolling, 22 cohort, programme duration 6–8 weeks. 31/32 services provide 2 sessions/week (1 service 1 session/week); 15/32 (47%) services had psychology input. Assessments took 0.5–2 h/patient. 32/32 (100%) services used walking tests and 11/32 (34%) followed repeat walk guidance; 11/23 ISWT, 0/9 6MWT. Questionnaires used ranged between 1 and 5, 13/32 (41%) services used more than two questionnaires (See Abstract P141 table 1 below). (insert table as separate attachment) There was no standard definition of completion; range 50%–100% sessions attended. The range of estimates of completion rates (using own definitions) was <30% to >80%.