Original Article

Psoas muscle index as a novel measure of frailty and predictor of post-operative outcome in octogenarians with non-small cell lung cancer

Hiral Jhala[1]^, Mathew Thomas[1], Leanne Ashrafian[2]

[1]Department of Cardiothoracic Surgery, Golden Jubilee National Hospital, Clydebank, UK; [2]Department of Thoracic Surgery, Guy's Hospital, London, UK

Contributions: (I) Conception and design: H Jhala, L Ashrafian; (II) Administrative support: All authors; (III) Provision of study materials or patients: H Jhala, M Thomas; (IV) Collection and assembly of data: H Jhala; (V) Data analysis and interpretation: All authors; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Hiral Jhala, MBBS, BSc (Hons). Department of Cardiothoracic Surgery, Golden Jubilee National Hospital, Agamemnon Street, Clydebank G81 4DY, UK. Email: hiraljhala.hj@gmail.com.

Background: High body mass index (BMI) is a prevalent risk factor in a growing octogenarian population undergoing curative surgery for non-small cell lung cancer (NSCLC). Whilst BMI is paradoxically protective, its correlation with clinical frailty or objective fitness is unclear, due to the discrepancy of the ratio between muscle and adipose tissue. We aim to assess the relationship between sarcopenia and post operative survival and complications.

Methods: Demographic and clinical outcome data from octogenarians undergoing resections for primary NSCLC (January 2016–December 2021) was analysed retrospectively. Routine pre-operative positron emission tomography-computed tomography (PET-CT) scan was used to derive psoas muscle index (PMI) (bilateral measurement of cross-sectional psoas muscle area at the level of L3, divided by height-squared) as a measure of sarcopenia.

Results: A total of 189 patients were recruited with a mean age 82 years. Median overall survival (OS) was 2.7 *vs.* 3.0 years in males and females, respectively (P<0.001). Chronic obstructive pulmonary disease (COPD) (P=0.02) and pathological stage >Ia (P=0.02) reduced OS. In males, OS at 5 years increased with PMI (58.3% for ≥9.0 *vs.* 0% at <4.9 cm^2/m^2) (P=0.04) and BMI (38.3% at 30–39.9 kg/m^2 *vs.* 0% at <18.5 kg/m^2) (P<0.001). In females, 5-year OS increased with BMI (100% at >30 kg/m^2) (P=0.05) but not with PMI. Median disease-free survival (DFS) was 2.8 *vs.* 2.7 years in males and females, respectively (P<0.001). The 5-year DFS was not affected by PMI or BMI in males nor females; 11.1% of patients had major postoperative complications, predicted by squamous cell carcinoma (P=0.03) and stage >Ia (P<0.01). Lower BMI ranges had proportionally more major complications in males (P<0.001), however the opposite was true for females. Mean hospital stay was 4 days longer in males, and doubled with higher BMI [12 days (range, 8–12 days); P=0.76]. BMI and PMI correlated positively in both males (r=0.36, P<0.001), and females (r=0.32, P=0.002).

Conclusions: Radiologically derived PMI is an easily replicable marker which may be a useful adjunct to BMI in identifying high-risk octogenarians in whom prehabilitation may achieve superior outcomes post-surgery for NSCLC. Additionally, the method we describe avoids additional imaging to derive these measurements and can be safely incorporated into pre-operative imaging protocols.

Keywords: Body mass index (BMI); psoas muscle index (PMI); lung cancer; octogenarians; prognosis

^ ORCID: 0000-0002-1267-5254.

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Introduction

Background

Surgical intervention for non-small cell lung cancer (NSCLC) has seen a rapid growth in octogenarians worldwide (1,2). Owing to multiple co-morbidities, octogenarians remain the highest risk patient cohorts despite advances in lung cancer surgery which offer excellent clinical and survival outcomes (3,4). A thorough risk assessment and optimisation of modifiable co-morbidities such as frailty and obesity, can ensure optimal post-operative outcome (5). Whilst some studies suggest obesity to have worse post-operative outcomes (6,7), others show a paradoxically protective outcome post lung cancer resection in those with a higher body mass index (BMI) compared to their underweight counterparts (8,9). Whilst low BMI and clinical frailty are negative predictors of poor post-operative outcomes (10), the two factors do not necessarily correlate with objective fitness due to the discrepancy of the ratio between muscle and adipose tissue (11). Pre-operative sarcopenia in elderly patients can confer up to a three-fold increased risk of complications post lung resection and adverse 5-year survival outcomes (12,13). Measures of sarcopenia may therefore better reflect functional fitness and predict survival and complication rate more accurately.

In younger patients, sarcopenia has been used as an alternative to BMI in other specialties despite the latter being more routine and convenient to measure, showing adverse outcomes if not optimised (14-16).

Highlight box

Key findings

- Higher psoas muscle index (PMI) shows longer overall and disease-free survivals, but underweight body mass index (BMI) and lower PMI conferred worse overall survivals.
- BMI and PMI showed a positive correlation with each other.
- Complications were higher in those with lower PMIs.

What is known and what is new?

- High BMI is a prevalent risk factor in octogenarians undergoing curative surgery for non-small cell lung cancer (NSCLC). Whilst BMI is paradoxically protective, its correlation with clinical frailty or objective fitness is unclear, due to the discrepancy of the ratio between muscle and adipose tissue.
- Little is known about sarcopenia as a prognostic indicator in octogenarians where lack of mobility and multiple comorbidities can greatly contribute to poor fitness despite higher BMI. To our knowledge this is the first UK study specifically comparing PMI as a marker of sarcopenia to BMI as measure of fitness in primary NSCLC in octogenarians and assess survival and post-operative outcomes.

What is the implication, and what should change now?

- Radiologically derived PMI is an easily replicable method, when used with BMI, of identifying high-risk octogenarians in whom prehabilitation may achieve superior outcomes post-surgery for NSCLC.
- The method we describe can safely be incorporated into pre-operative imaging protocols without the need of additional imaging.

Rationale and knowledge gap

Little is known about sarcopenia as a prognostic indicator in octogenarians where lack of mobility and multiple comorbidities can greatly contribute to poor fitness despite higher BMI. To the best of our knowledge there is yet to be a study specifically comparing the prognostic value of psoas muscle index (PMI) as a marker of sarcopenia *vs.* BMI as a measure of fitness in primary NSCLC in octogenarians.

Objective

We present the first study in octogenarians with primary NSCLC in the UK which aims to correlate PMI to outcomes of survival and post operative complications, and to evaluate the prognostic value of PMI and BMI as predictors of survival and adverse outcomes. We present this article in accordance with the STROBE reporting checklist (available at https://jtd.amegroups.com/article/view/10.21037/jtd-24-1543/rc).

Methods

Patient recruitment and data collection

Patients over 80 years of age who underwent curative lung resection for confirmed or suspected lung cancer surgery

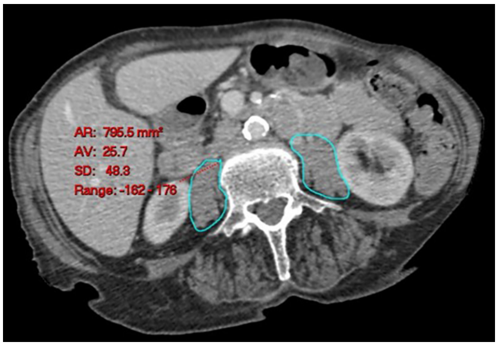

Figure 1 Axial PET-CT scan image at level L3 with manually traced cross-sectional areas of bilateral psoas muscles. The blue zones indicated, represent the manually traced psoas muscle areas. AR, area in mm^2; AV, volume; SD, standard deviation; PET-CT, positron emission tomography-computed tomography.

at a single institution (Golden Jubilee National Hospital) between January 2016–December 2021 were recruited. Out of 214 patients, 25 patients were excluded due to having lung metastases, or benign diagnoses at final histopathology. A total of 189 patients with established primary NSCLC were subsequently included in this study and analysed. Demographic, clinical and outcome data were collected retrospectively from a local database (CaTHi Electronic Medical Records at Golden Jubilee National Hospital). Amongst these, BMI was calculated based on height and weight parameters measured prospectively at pre-operative clinic appointments and cross examined with BMI values reported on pre-operative lung function test reports. BMI was classified by severity according to the National Institute for Health and Care Excellent (NICE) guidelines (17).

Derivation of PMI and determining sarcopenia

Radiological derivation of PMI was selected as a convenient and reliable measure of sarcopenia with minimal variability and subjectivity compared to functional assessments of frailty. Axial views of the computed tomography (CT) component of the most recent pre-operative positron emission tomography (PET) scans within three months of the surgery were derived from the electronic imaging database Carestream PACS® (Carestream Health, Inc., Rochester, NY, USA). Axial shots at the third lumbar vertebral level (L3) were examined and manual tracing of the psoas muscle bilaterally was performed to calculate the cross-sectional psoas muscle area in mm^2, which was then converted to cm^2, to be used as a surrogate marker for sarcopenia (*Figure 1*). The PMI was calculated by dividing the cross-sectional psoas muscle area at L3 (cm^2), by the height squared (m^2). Receiver operating characteristic (ROC) curve analysis was performed to determine sex-adjusted PMI cut-off values which were found at <3.2 cm^2/m^2 for males, and <2.7 cm^2/m^2 in females (Figure S1), however the sample size for a lower range (N=4) was not sufficient for effective statistical analysis. Therefore, for subgroup analysis, sex-adjusted PMI values were categorised in incremental groups of 2 cm^2/m^2 rather than sarcopenia *vs.* no sarcopenia for statistical analysis. Comparison analysis was carried out with BMI ranges in kg/m^2. Post-operative complications were categorised according to severity based on the Clavien-Dindo Classification (CDC). Major complications were defined as CDC classes III–V.

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Institutional Ethics Board of Department of Clinical Governance of the Golden Jubilee National Hospital (No. SC045146). Informed consent for this retrospective analysis was waived. The authors have ensured the article has been sufficiently anonymised to cause no harm to the patients or their families.

Statistical analysis

Continuous variables are presented as median (range) or mean ± standard deviation (SD) as appropriate. Categorical variables are presented as N (%). Univariate analysis was performed using two-tailed *t*-tests and one-way analysis of variance (ANOVA) tests for continuous variables as appropriate. Univariate analysis for categorical parameters was performed using Chi-squared or Fisher's exact tests and expressed as hazard ratio (HR) or odds ratio (OR) and 95% confidence interval (95% CI). Multivariate analysis was performed using linear regression methods. Survival analyses was performed using the Kaplan-Meier method and compared using Log-rank tests. Correlations between continuous variables were performed using Pearson's correlation coefficients. Statistical significance was deemed at P value <0.05. All statistical analysis was performed using Prism 9.5.1 (GraphPad Software).

Results

Patient characteristics

Out of 189 octogenarians, with a mean age of 82 years, 93

Table 1 Demographic, clinical and operative characteristics

Characteristic	Number	Percentage (%)
Sex		
Male	93	49.2
Female	96	50.8
Performance status		
0	109	57.7
1	80	42.3
Lung function tests (% predicted)		
FEV_1	–	96.5
TLCO	–	71
Smoking status		
Current	29	15.3
Ex-smoker	125	66.1
Never	35	18.5
Comorbidities		
Hypertension	99	52.4
Diabetes	29	15.3
COPD	55	29.1
AF	24	12.7
CKD	49	25.9
Anaemia	60	31.7
Other CVS	92	48.7
WCC >12×10^9/L	12	6.3
CRP >10 mg/L	38	20.1
Obesity (BMI >30 kg/m^2)	30	15.9
Type of resection		
Pneumonectomy	2	1.1
Bilobectomy	9	4.8
Lobectomy	132	69.8
Segmentectomy	6	3.2
Wedge	40	21.2
Approach		
RATS	19	10.1
VATS	121	64.0
Thoracotomy	49	25.9
Histological type		
Adenocarcinoma	106	56.1
Adenosquamous	2	1.1
Squamous cell carcinoma	69	36.5
Other[a]	17	9.0
Pathological staging		
IA1	12	6.3
IA2	47	24.9
IA3	21	11.1
IB	42	22.2
IIA	13	6.9
IIB	25	13.2
IIIA	22	11.6
IIIB	7	3.7

Table 1 (continued)

Multiple subtypes in one patient in the form of more than one tumour are also included in this analysis. [a], pleomorphic carcinoma, typical carcinoid, atypical carcinoid. CVS, cardiovascular; WCC, white cell count; CRP, C-reactive protein; FEV_1, forced expiratory volume in 1 second (mL); TLCO, transfer factor for carbon monoxide; COPD, chronic obstructive pulmonary disease; AF, atrial fibrillation; CKD, chronic kidney disease; BMI, body mass index; RATS, robotic assisted thoracic surgery; VATS, video-assisted thoracoscopic surgery.

were male and 96 were female. Demographic and clinical data can be found in *Table 1*. In particular, 30 patients (15.9%) were obese. As expected, the median PMI was higher in males (6.26 cm^2/m^2; range, 3.1–11.5 cm^2/m^2) compared to females (5.28 cm^2/m^2; range, 2.6–11.6 cm^2/m^2). Multiple histological subtypes occurring in more than one tumours excised from a single patient in a single operation, are also included in this analysis, as reflected in the overall percentages (*Table 1*).

Overall survival (OS)

In this cohort, the all-cause mortality after a median follow-up of 4.5 years was 54.5%. In hospital mortality was 1/189 (0.5%) and 90-day mortality was 6/189 (3.2%). Median OS for the whole cohort was 3.5 years (OS at 1, 3 and 5 years was 82.5%, 57.1% and 38.2%, respectively). Obesity had a

Table 2 Summary of univariate analysis of statistically significant predictors of reduced OS and reduced DFS

Characteristic	HR	95% CI	P
Reduced OS			
COPD	1.5	1.0–2.4	0.02
Obesity (BMI >30 kg/m^2)	0.5	0.3–0.9	0.04
Stage >Ia	1.6	1.1–2.4	0.02
Reduced DFS			
Performance status ≥1	1.4	0.9–2.2	0.04
Obesity (BMI >30 kg/m^2)	0.9	0.5–1.6	0.81

OS, overall survival; DFS, disease-free survival; HR, hazard ratio; CI, confidence interval; COPD, chronic obstructive pulmonary disease; BMI, body mass index.

protective effect on OS (HR 0.5, 95% CI: 0.3–0.9, P=0.04) (*Table 2*). Chronic obstructive pulmonary disease (COPD) (P=0.02) and pathological stage >Ia (P=0.02) conferred a worse OS. The median OS was 2.7 and 3.0 years in males and females, respectively (P<0.001) (*Figure 2*). In males, the OS at 5 years increased with PMI (0% at ranges 2.5–4.9 cm^2/m^2, to 58.3% at ≥9.0 cm^2/m^2; P=0.04), as well as with BMI (0% at <18.5 to 38.3% at 30–39.9 kg/m^2; P<0.001) (*Table 3*). In females this is echoed in BMI (P=0.05), but not with PMI although the 5-year OS was 100% in PMI ≥9.0 cm^2/m^2 (P=0.86).

Disease-free survival (DFS)

The median DFS for the whole cohort was 3.1 years (DFS at 1, 3 and 5 years was 77.3%, 51.0% and 42.7%, respectively). Obesity had a protective effect on DFS (HR 0.9, 95% CI: 0.5–1.6; P=0.81), however a performance status ≥1 reduced DFS (P=0.04) (*Table 2*). DFS was 2.8 and 2.7 years in males and females, respectively (P<0.001) (*Figure 2*). DFS at 5 years was not affected by increasing PMI in either males (P=0.76) or females (P=0.48) (*Table 3*). DFS at 5 years was not affected by BMI in either males (P=0.98) or females (P=0.23).

Major complications and length of hospital stay (LOS)

Ninety-nine patients (52.3%) experienced post-operative complications (CDC I: n=32; CDC II: n=56; CDC III n=5; CDC IV n=4; CDC V n=2). The most common complications were atrial fibrillation (n=24, 12.7%), stroke (n=3, 1.6%), persistent air leak (n=29, 15.3%), chest infection (n=35, 18.5%), high dependency unit (HDU)/intensive therapy unit (ITU) re-admission (n=5, 2.6%), re-intubation (n=4, 2.1%), renal failure (n=5, 2.6%), and chronic pain (n=3, 1.6%). Eleven patients (11.1%) had major post-operative complications. The percentage of major complications in each subgroup of PMI and BMI in males and females are shown in *Table 4*. Lower BMI ranges had proportionally more major complications in males (P<0.001), however the opposite was true in females (P=0.73). An elevated white cell count (P=0.04), squamous cell carcinoma (P<0.01), and high tumour stage (P<0.01) conferred higher rates of major post operative complications (*Table 5*). However, the strongest predictors of major postoperative complications on multivariate regression analysis were squamous cell carcinoma subtype (P=0.03); stage >Ia (P<0.01) and previous cardiovascular history (P=0.04) (*Table 6*). Median LOS was 12.6 days in males and 8.7 days in females. In both males and females, LOS was highest in patients with BMI <18.5 kg/m^2 (18.0 *vs.* 16.0 days, respectively) being more than double the LOS in the higher BMI ranges (both 6 days P<0.001, P=0.05).

PMI to BMI ratio

BMI and PMI correlated positively in both males (r=0.36, P<0.001), and females (r=0.32, P=0.002) (*Figure 3*). The median PMI/BMI ratio was 2.5 *vs.* 0.2 in males and females, respectively. In males, the PMI/BMI ratio did not correlate significantly with OS (r=0.12, P=0.23), DFS (r=0.15, P=0.19) or LOS (r=0.04, P=0.71). In females, the PMI/BMI ratio also did not correlate significantly with OS (r=0.02, P=0.86), DFS (r=0.01, P=0.92), or LOS (r=0.02, P=0.88). Area under the curve (AUC) analyses were comparable between PMI and BMI for OS at 5 years (0.516 *vs.* 0.517, respectively), DFS at 5 years (0.542 *vs.* 0.538, respectively), and major complications (0.513 *vs.* 0.581, respectively).

Discussion

Key points

Our study has shown a greater 5-year OS with increasing BMI especially in males, which validates previous findings in the literature (9). In males, higher PMI also correlated with a better OS. Underweight BMIs conferred a reduced OS, reduced DFS, more complications in males, and longer LOS. BMI and PMI correlated positively in both genders but weakly, which may reflect the multifactorial effect

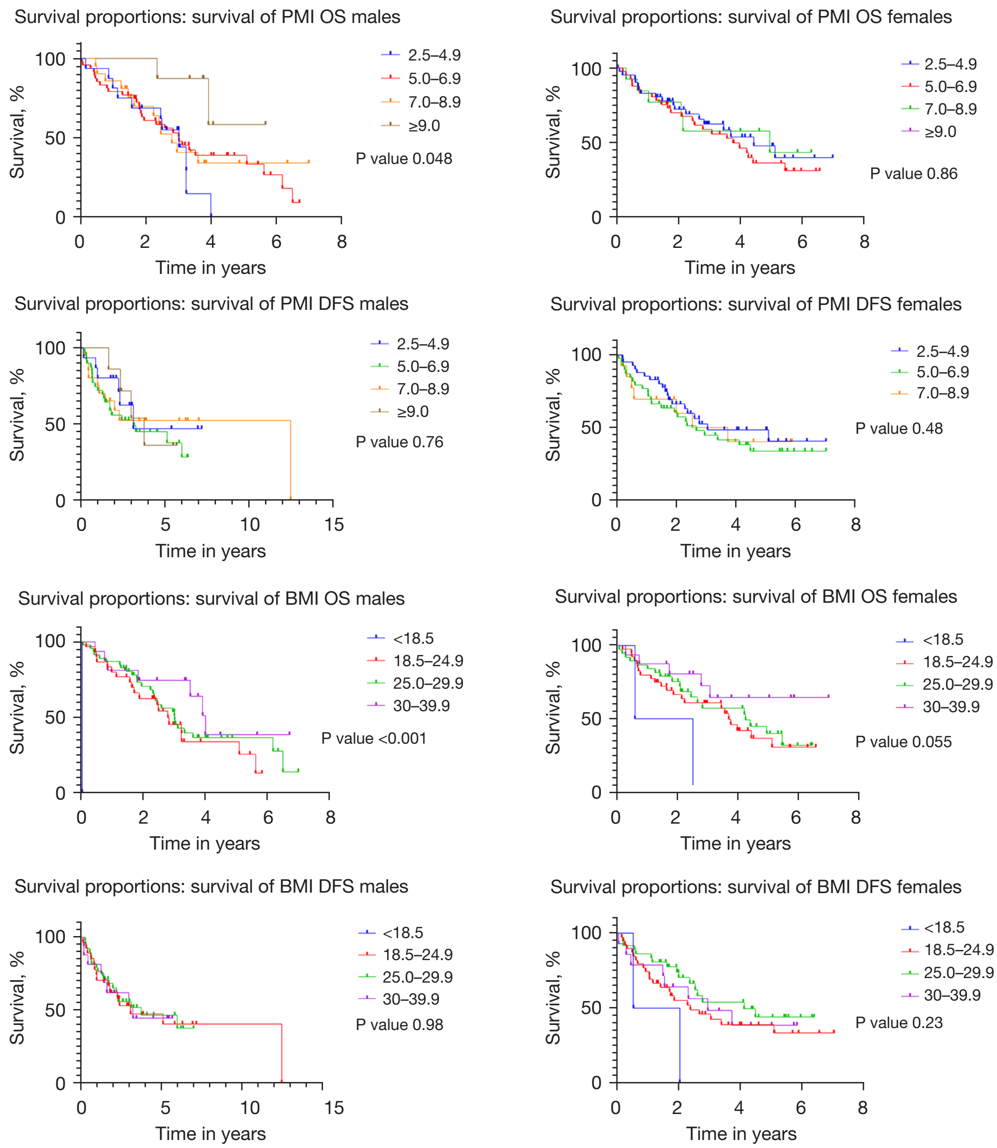

Figure 2 OS and DFS in males and females according to PMI (cm^2/m^2) and BMI (kg/m^2). OS, overall survival; DFS, disease-free survival; PMI, psoas muscle index; BMI, body mass index.

of reduced performance status and pathological tumour subtype on reducing muscle mass. The resultant frailty due to sarcopenia can contribute to complications and increase hospital stay, by up to double the stay of their higher PMI and BMI range counterparts. Extremes of PMI and BMI and reduced performance status were unfavourable for DFS in both genders however not significantly.

Overall, in our population of octogenarians only four patients were statistically sarcopenic on ROC analysis, potentially reflecting a good pre-morbid functional fitness of the study population, the majority of whom (57.7%) were of performance status 0. Hence, PMI and performance status together may be useful in assessing frailty in octogenarians, in addition to BMI, allowing careful selection of patients for surgery. Whilst skeletal muscle index has been shown elsewhere to predict DFS and OS, highlighting the need for pre-habilitation (18), there is a need for more formal rehabilitation trials to assess its role in optimising physiological reserve ensuring a durable oncological benefit after surgery. A recent meta-analysis of 23 studies showed that structured long-term supervised pre-operative exercise interventions conferred the greatest reduction in

Table 3 OS and DFS for PMI ranges and BMI ranges for males and females

Characteristic	OS (%)				DFS (%)			
	1-year	3-year	5-year	Log rank P value	1-year	3-year	5-year	Log rank P value
Males								
PMI (cm^2/m^2)				0.04				0.75
2.5–4.9	75.0	55.0	0.0		80.0	62.2	46.7	
5.0–6.9	77.1	53.2	33.2		71.8	52.5	37.2	
7.0–8.9	80.9	40.7	33.9		75.0	52.0	52.0	
≥9.0	100.0	87.5	58.3		100.0	53.6	35.6	
BMI (kg/m^2)				<0.001				0.98
<18.5	0.0	0.0	0.0		100.0	100.0	100.0	
18.5–24.9	76.7	45.0	25.3		70.4	53.0	40.4	
25.0–29.9	87.0	53.5	36.5		78.9	55.8	46.6	
30–39.9	87.5	74.5	38.3		75.0	53.0	44.2	
Females								
PMI (cm^2/m^2)				0.86				0.48
2.5–4.9	82.9	62.4	47.8		85.0	48.0	48.0	
5.0–6.9	82.9	55.8	36.1		76.3	44.1	33.2	
7.0–8.9	76.9	57.7	43.3		69.2	49.5	39.6	
≥9.0	100.0	100.0	100.0		–	–	–	
BMI (kg/m^2)				0.05				0.23
<18.5	50.0	0.0	0.0		50.0	0.0	0.0	
18.5–24.9	80.0	60.8	36.9		71.8	42.3	38.8	
25.0–29.9	84.2	57.2	39.9		86.1	53.9	43.9	
30–39.9	87.5	64.6	64.6		78.6	48.2	38.6	

OS, overall survival; DFS, disease-free survival; PMI, psoas muscle index; BMI, body mass index.

Table 4 Percentage major complications in each subgroup of PMI and BMI in males and females

Characteristic	Males		Females	
	Complications (%)	Chi-squared P value	Complications (%)	Chi-squared P value
PMI (cm^2/m^2)		0.15		0.14
2.5–4.9	6.3		7.3	
5.0–6.9	8.3		0.0	
7.0–8.9	0.0		15.4	
≥9.0	25.0		0.0	
BMI (kg/m^2)		<0.001		0.73
<18.5	100.0		0.0	
18.5–24.9	30.0		2.5	
25.0–29.9	2.2		7.9	
30–39.9	6.3		6.3	

PMI, psoas muscle index; BMI, body mass index.

Table 5 Summary of univariate analysis of statistically significant predictors of major postoperative complications.

Characteristic	OR	95% CI	P
Other CVS	0.5	0.3–0.9	0.02
WCC >12×10^9/L	4.9	1.1–22.9	0.04
Wedge resection	0.5	0.2–0.9	0.04
Squamous cell carcinoma	2.3	1.2–4.2	<0.01
Stage >Ia	15.3	2.5–16.9	<0.01

CVS, cardiovascular; WCC, white cell count; OR, odds ratio; CI, confidence interval.

Table 6 Multivariate linear regression analysis of statistically significant predictors of major postoperative complications

Characteristic	OR	95% CI	P
Other CVS	2.1	−0.3 to 3.0	0.04
Stage >Ia	3.7	0.06 to 4.19	<0.01
Squamous cell carcinoma	2.2	0.04 to 2.59	0.03
BMI	1.4	−0.03 to 1.5	0.15
PMI	0.23	−0.05 to 0.4	0.82

OR, odds ratio; CI, confidence interval; CVS, cardiovascular; BMI, body mass index; PMI, psoas muscle index.

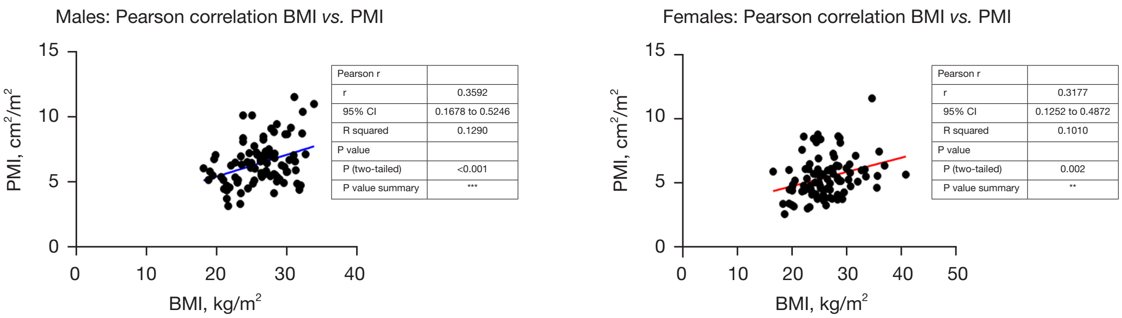

Figure 3 Pearson correlation between BMI and PMI in both males and females. **, P<0.01; ***, P<0.001 both statistically significant. BMI, body mass index; CI, confidence interval; PMI, psoas muscle index.

post-operative complications and LOS compared to peri-operative or post-operative rehabilitation (19). Furthermore, rehabilitation programmes focussed on optimising pre-operative physical activity levels, rather than just pulmonary function, can confer post operative benefits in survival and complications even in the elderly population (20). Bradley *et al.* describe a structured rigorous pre and post operative rehabilitation programme involving exercise classes to improve functional fitness test results, smoking cessation advice, dietary advice and patient education over 18 months (21). Preliminary results demonstrated a 7% reduction in postoperative pulmonary complications, and 10% reduction in readmissions to hospital (21). In an aging population with co-morbidities where careful selection of patients is necessary, efforts should be made to optimise physical reserve ahead of surgery to ensure lasting prognostic benefits. However, such prehabilitation programmes cannot last more than a couple of weeks, especially in the context of NSCLC where there is high risk of progressive disease, hence the emphasis must always be on careful selection of individuals who may confer the most benefit from surgery whilst having fewer complications.

The observed discrepancy between the contribution of muscle and adipose tissue to BMI, has prompted a shift in favour of using radiological measurements of muscle composition to refine risk assessment in surgical patients. In the context of NSCLC, parameters such as psoas muscle volume (22), derivation of skeletal muscle indices, and radiological indicators of metabolic uptake (23), have successfully demonstrated poor prognoses in sarcopenic individuals irrespective of pathological staging. Additionally, our study validates the feasibility of measuring L3 muscle areas to derive PMI from the most recent routine pre-operative PET-CT scans avoiding the necessity for additional time-consuming functional testing or imaging. Whilst our findings are echoed by key studies measuring L3 cross sectional psoas area showing reduced 5-year OS, DFS and more complications in sarcopenic individuals across early (24) and late-stage NSCLC (25-27), they were performed in younger patient cohorts. There are relatively few studies in the literature describing these phenomena in elderly patients or octogenarians (28). Kawaguchi *et al.*, using similar methodology, showed a 26.5% 5-year survival rate and 62.5% complication rate in patients aged over 75 with low PMI (12).

In our cohort, the 5-year OS survival was 0% in males with the lowest range PMI (2.5–4.9 cm^2/m^2), perhaps due to differences in the distribution of pathological subtype which had the highest influence on OS in our study population.

To our knowledge, this is the first UK study presenting short and long-term outcomes of PMI alongside BMI after lung cancer resection in the octogenarian population. Octogenarians naturally have more co-morbidities than their younger counterparts, making rigorous risk assessment all the more necessary to facilitate selection of the most appropriate patients for surgery. Radiologically derived PMI in addition to BMI, can potentially serve as a useful, feasible and easily replicable method of identifying high-risk octogenarians in whom prehabilitation to optimise PMI and BMI may achieve superior outcomes. Modifiable parameters of muscle strength such as hand grip strength can be identified through a comprehensive geriatric assessment and incorporated into formal pre-habilitation programmes to further optimise outcomes in already carefully selected octogenarians (29).

Limitations and future directions

Our study population had good pre-operative performance status and fitness level, potentially hindering us from obtaining equal numbers of patients either side of the cut-off ranges for sarcopenic PMI ranges on ROC analysis. Despite our small sample size and retrospective study design, we present a starting point for further larger, multicentre studies to validate our results, due to the lack of literature analysing these parameters in octogenarians specifically. Additionally, further robust studies are required to decipher the validity of sarcopenia as a diagnostic tool compared to the conventional BMI for accurate assessment of fitness for surgery.

Conclusions

Radiologically derived PMI is an easily replicable marker which may be a useful adjunct to BMI in identifying high-risk octogenarians in whom prehabilitation may achieve superior outcomes after surgery for NSCLC. Additionally, the method we describe avoids additional imaging to derive these measurements and can safely be incorporated into pre-operative imaging protocols.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://jtd.amegroups.com/article/view/10.21037/jtd-24-1543/rc

Data Sharing Statement: Available at https://jtd.amegroups.com/article/view/10.21037/jtd-24-1543/dss

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