European Journal of Surgical Oncology 52 (2026) 111888

Contents lists available at ScienceDirect

European Journal of Surgical Oncology

journal homepage: www.ejso.com

Review Article

CT-derived body composition and clinical outcomes in ovarian cancer patients: A scoping review

Nikolaj Ohm [a,b,*], Maria Møller Andersen [c], Jakob Ohm Oreskov [a], Claus Høgdall [a], Tine Henrichsen Schnack [d]

[a] Department of Gynecology, Rigshospitalet, Copenhagen University Hospital, Copenhagen, Denmark
[b] University of Copenhagen, Faculty of Health and Medical Sciences, Copenhagen, Denmark
[c] Department for Stomach, Intestinal and Liver Diseases, Herlev Hospital, Herlev, Denmark
[d] Department of Gynecology, Odense University Hospital, Odense, Denmark

A B S T R A C T

Introduction: Epithelial ovarian cancer (EOC) is associated with poor prognosis. Computed tomography (CT)-derived body composition, encompassing muscle and adipose tissue metrics, has emerged as a potential biomarker for prognosis and treatment guidance. This scoping review maps current evidence on associations between CT-derived body composition and clinical outcomes in EOC, with attention to methodological variation and research gaps.

Methods: The review protocol was prospectively registered in the Open Science Framework on December 11, 2024: https://osf.io/4p5u6. A comprehensive literature search was conducted in Medline (via PubMed), Embase (via Ovid), and Web of Science, following JBI methodology for scoping reviews and PRISMA-ScR guidelines. Eligible studies assessed CT-derived body composition in relation to clinical outcomes among EOC patients.

Results: 50 studies were included, 47 retrospective. Muscle and fat quantities were measured as cross-sectional areas or volumetric estimates, while muscle quality was assessed as skeletal muscle radiodensity in Hounsfield Units (HU). Considerable heterogeneity was observed in measurement techniques, anatomical landmarks, and cut-off definitions for sarcopenia and adiposity. Outcomes investigated included survival, chemotherapy-related, and surgical endpoints. Muscle quality, joint fat–muscle measures, and treatment-related muscle loss were more consistently predictive of survival than muscle mass or adipose tissue alone. Associations with chemotherapy-related and surgical outcomes were less consistent.

Conclusion: CT-derived body composition may have prognostic relevance in EOC; however, associations remain inconsistent and is largely based on retrospective studies. Findings should therefore be considered hypothesis-generating. Methodological inconsistencies limit clinical applicability and highlight the need for standardized measurement techniques, consensus cut-offs, and prospective validation.

1. Introduction

Ovarian cancer ranks eighth worldwide for incidence and mortality among women, with an estimated 324,398 new cases and 206,839 deaths in 2022 [1]. Epithelial ovarian cancer (EOC) is the leading cause of gynecological cancer death in Denmark, where 450 cases are diagnosed annually, and approximately 70% present with Federation of Gynecology and Obstetrics (FIGO) stage II-IV, with a median age of 63 years [2]. Among patients with advanced stages, 5-year survival rates are approximately 47% in patients who undergo radical surgery, compared to 15% for those who do not [3]. Curative treatment typically combines surgery and chemotherapy, which remains the cornerstone of management [2].

Complete tumor resection is a critical determinant of survival [4]. However, a recent Danish study reported that 52% of patients aged ≥70 years did not undergo surgery, compared to only 25% of younger patients [5]. Older patients were also less likely to receive intensive oncological treatment, a disparity associated with poorer cancer-specific survival [5]. Despite evidence that both older and younger patients benefit similarly from standard treatment, treatment decisions in older patients often appear influenced by concerns about frailty or tolerability [6]. This highlights an urgent need for objective risk stratification tools to support equitable treatment planning.

Currently, no frailty-screening tool has been validated to predict clinical outcomes in EOC [6]. In this context, computed tomography (CT)-derived body composition analysis has gained attention as a potential biomarker. CT is the gold standard for evaluating muscle and adipose tissue. It enables assessment of muscle mass and composition, relevant to sarcopenia, defined as age-associated loss of skeletal muscle mass and function [7]. Cross-sectional fat and muscle areas at the L3 level reflect whole-body composition [8], and CT imaging is already standard in EOC for diagnosis, staging, and follow-up. CT-derived body

* Corresponding author. Charlotte Muncks vej 8, 2. th, 2400, Copenhagen, NV, Denmark.
E-mail address: nikolajohm@gmail.com (N. Ohm).

https://doi.org/10.1016/j.ejso.2026.111888
Received 2 September 2025; Received in revised form 11 May 2026; Accepted 14 May 2026
Available online 19 May 2026

composition metrics may offer a practical, non-invasive tool to guide personalized treatment. They may help identify patients who could benefit from preoperative optimization, improve patient selection for surgery, optimize surgical outcomes, and support chemotherapy completion.

Emerging evidence suggests that CT-derived body composition is associated with clinical outcomes in EOC. Sarcopenia has been linked to worse overall survival (OS) [9], visceral obesity to increased post-operative complications [10], and combined fat-muscle phenotypes to higher mortality risk [11]. However, existing reviews report inconsistent findings. This likely reflects methodological heterogeneity across studies, including differences in body composition measurement techniques, anatomical landmarks and cut-off definitions [12–15]. Previous systematic reviews have primarily examined individual body composition metrics or single clinical outcomes, providing limited insight into broader methodological diversity. A scoping review is therefore warranted to map the extent and nature of evidence across CT-derived body composition parameters, analytical approaches, and clinical outcomes. The present review provides a broader overview of current research. It aims to support methodological standardization, improve comparability and promote reproducibility. It also explores the potential future role of body composition assessment in routine clinical workflows.

1.1. Study aims and review questions

This scoping review addresses the overarching question: among patients with EOC (Population), how have CT-derived body composition metrics (Concept) been used to assess associations with clinical outcomes (Context)? The review aims to map the evidence, identify recurring patterns and examine methodological variation in CT-derived body composition assessment in EOC.

To operationalize this objective the review is guided by the following sub-questions:

> "What is the current scientific and clinical evidence on the association between CT-derived body composition and clinical outcomes in EOC patients?".

> "What are the methodological differences across studies assessing body composition using CT imaging, regarding study population, measuring techniques and cut-off values?"

2. Methods

This scoping review followed the Joanna Briggs Institute (JBI) methodology [16] and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist [17]. The protocol was prospectively registered in the Open Science Framework on December 11, 2024 (https://osf.io/4p5u6).

2.1. Search strategy

A block search strategy was developed based on the review questions, considering the population (EOC patients), concept (CT-derived body composition) and context (clinical outcomes).

Searches were performed in Medline (via PubMed), Embase (via Ovid) and Web of Science, with no restrictions on publication date. Only peer-reviewed, original research articles in English were included. The search strategy was developed with an external information specialist from the Royal Danish Library. The Peer Review of Electronic Search Strategies (PRESS) checklist was not formally applied; however, the strategy underwent independent peer review by a second information specialist from the Center for Health Research, University Hospital Copenhagen. The final search was conducted on November 21, 2024; no update search was performed prior to submission. Full search strings are provided in S1. Reference lists of relevant reviews were screened to identify additional eligible studies. Reviews were included for reference screening if they met all inclusion criteria except being original research.

2.2. Study selection

All search results were imported into Covidence systematic review software [18], where duplicates were removed. Two reviewers independently screened titles/abstracts and full texts. Before each phase, a calibration exercise was performed in which both reviewers independently screened a random sample of records (50 titles/abstracts and 10 full texts). Discrepancies were discussed to ensure consistent application of eligibility criteria. Discrepancies after formal screening were resolved through discussion between the two reviewers. No third reviewer was required.

Studies were eligible for inclusion if they:

1. Reported original peer-reviewed research
2. Included only patients with EOC, or reported disaggregated data for EOC patients within broader cancer cohorts
3. Assessed CT-derived body composition
4. Examined associations between body composition and clinical outcomes

Studies were excluded if they:

1. Focused on non-EOC populations
2. Included EOC patients among other cancers without reporting EOC-specific results
3. Did not use CT imaging for body composition analysis
4. Lacked outcome data

No age restrictions were applied. Studies including participants <18 years were eligible if adults comprised the majority. Age distribution was not used as a selection criterion but was recorded descriptively when available, given its potential influence on body composition and outcomes.

After full-text review and data extraction, five studies were identified that exclusively included patients with relapsed EOC. This subgroup represents a clinically distinct population, in which body composition and clinical outcomes are influenced not only by baseline patient factors and tumor burden, but also by prior treatment and cumulative toxicity. In this setting, clinical outcomes follow a different prognostic framework. Even similarly defined endpoints may reflect fundamentally different clinical processes than in the initial-treatment setting. As a result, associations between body composition and outcomes may not be directly comparable across these contexts.

These studies were therefore excluded post hoc to preserve homogeneity in disease setting and treatment context. This decision may introduce selection bias by preferentially removing a clinically distinct subgroup. As a result, the review may be weighted toward newly diagnosed or initial-treatment populations, and associations relevant to relapsed or heavily pre-treated patients may be underrepresented. A complete list of excluded full-text articles and corresponding reasons for exclusion is provided in S2.

2.3. Data extraction

A standardized data extraction tool was developed and pilot-tested on a subset of studies. The final tool captured: study characteristics (authors, year, country, design, objective), population characteristics (sample size, age, FIGO stage, performance status, treatment regimen), body composition assessment (measurement technique, anatomical site, definitions, cut-off values), clinical outcomes, key findings and stated limitations.

Data were extracted independently by two reviewers using Covidence. The extraction tool was applied uniformly across all studies.

Disagreements were resolved through discussion. The finalized extraction tool is provided in S3.

2.4. Analysis and presentation of results

The approach to data synthesis was guided by the Synthesis Without Meta-analysis (SWiM) reporting guideline [19].

Studies were grouped by outcome category (survival, chemotherapy-related or surgical outcomes) and CT-derived body composition metric (muscle quantity, muscle quality, adipose tissue, combined fat-muscle indices or treatment-related changes).

Results were synthesized using vote counting based on the direction and statistical significance of reported associations. No quantitative pooling of effect sizes was undertaken. Within each outcome-body composition grouping, studies were summarized in tables and synthesized narratively.

Body composition-outcome associations reported across multiple studies were prioritized to support a structured presentation of the evidence. Vote counting and prioritization were applied descriptively to identify recurring patterns within a heterogeneous body of literature. They were not used to infer the strength, certainty, or causal nature of reported associations. Heterogeneity was explored by comparing study design, populations, measurement methods, anatomical landmarks and cut-off definitions among prioritized study groups. This aimed to identify common factors influencing outcomes. No formal quality appraisal or risk-of-bias assessment was undertaken.

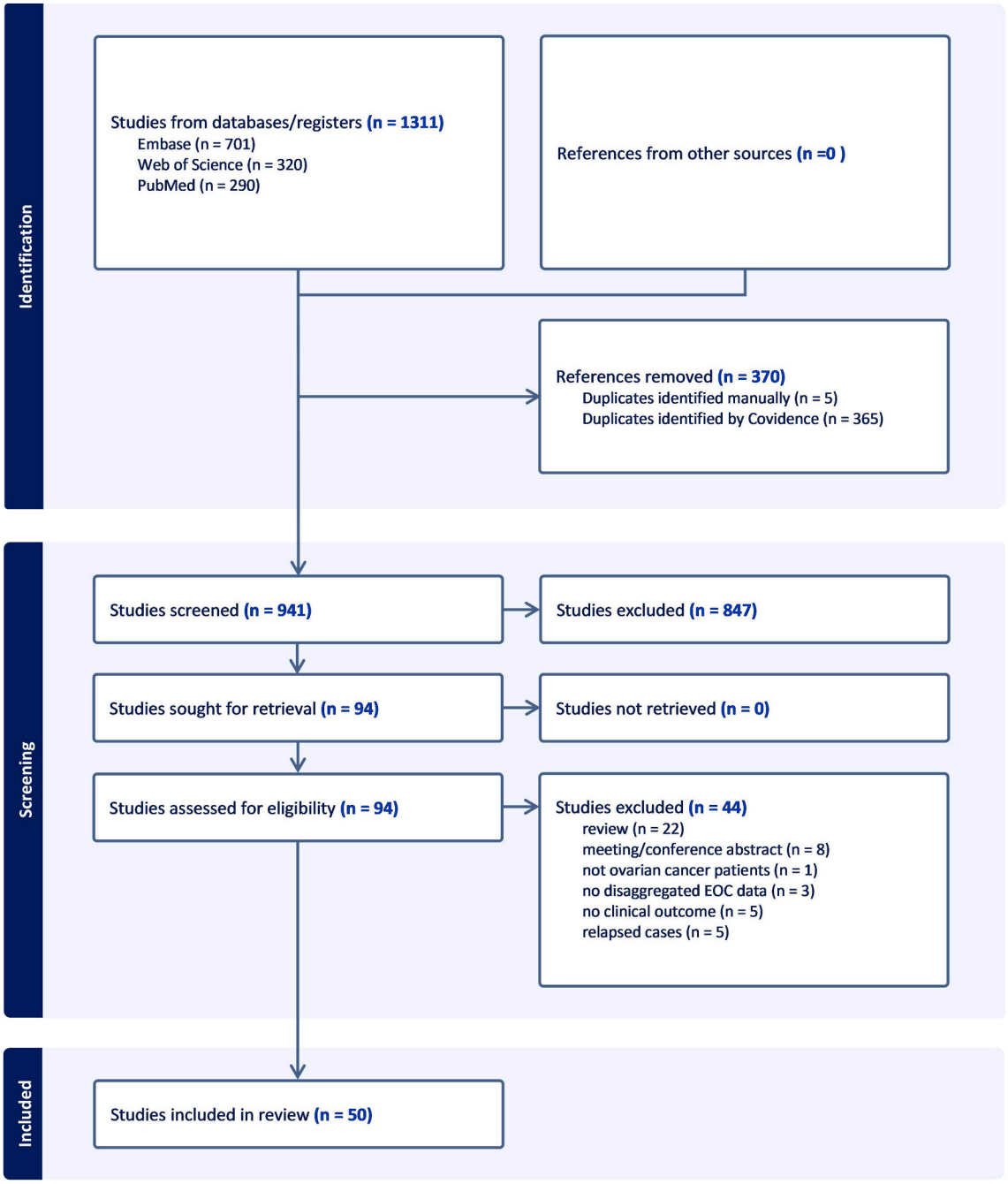

Fig. 1. PRISMA flow diagram.

3. Results

3.1. Study identification

Searches retrieved 1311 records. 370 duplicates were removed, leaving 941 records for screening. After title and abstract screening, 94 full-text articles were assessed for eligibility. Following full-text review, 44 articles were excluded, leaving 50 included studies. Study selection is shown in a PRISMA flow diagram (Fig. 1).

Ten review articles met the criteria for reference list screening, but no additional eligible studies were identified. Details of these reviews are presented in S2.

Inter-rater reliability was high, with proportionate agreement of 96% at title/abstract screening, and 94% at full-text review. Inter-rater statistics are presented in S4.

3.2. Study characteristics

The included studies originated from 15 countries. Asia contributed 16 studies [10,20–34], Europe (including Turkey) 16 studies [35–50], and North America (USA) 14 studies [11,51–63].

Study designs comprised 47 retrospective studies [9–11,20–40, 42–55,57–62,64–66], one prospective study [41], and two ancillary studies [56,63]. Both ancillary studies were secondary analyses from the same phase III GOG-218 randomized trial and therefore did not represent independent study populations.

Assessment of study institutions, recruitment periods and eligibility criteria suggested potential or certain cohort overlap across several studies: three studies from Taiwan [32–34], two pairs from Japan [22, 23]; [20,25], two pairs from the Netherlands [37,39]; [35,40]: and four studies from the USA [51,52,55,60]. Cohort overlap was considered relevant only when studies contributed to the same body composition–outcome grouping, as this could overrepresent findings. Studies drawing on overlapping cohorts but examining different metrics or outcomes were not considered to bias the synthesis. Only two instances met this criterion ([37] and [39]; [51] and [52]). These were acknowledged in the narrative synthesis to avoid implicit double-counting and were not treated as independent confirmations of associations. Nevertheless, overlapping cohorts may still inflate the apparent consistency of findings and should be considered when interpreting the synthesized evidence.

Regional and temporal patterns was found. Psoas-based muscle metrics appeared predominantly in studies from the Netherlands, Japan, Turkey, and Chile. Automated and volumetric segmentation methods were used almost exclusively in more recent publications, reflecting advances in imaging technology. Earlier studies focused mainly on survival outcomes, whereas later research increasingly incorporated surgical and chemotherapy-related endpoints.

Included studies and extracted data are provided in Appendix A.

3.3. Study populations

Sample sizes ranged from 31 [50] to 1538 participants [56]. The median sample size was 137 (interquartile range, 131). 17 studies (34%) included <100 participants, 17 (34%) included 100-200, and 16 (32%) included >200 participants. Age ranged from 15 to 90 years.

Treatments included primary debulking surgery (PDS) followed by adjuvant chemotherapy (ACT), neoadjuvant chemotherapy (NACT) followed by interval debulking surgery (IDS), platinum- and taxane-based chemotherapy and maintenance therapies such as bevacizumab or olaparib. Patients represented FIGO stages I-IV with performance status ranging from 0 to 4 on the Eastern Cooperative Oncology Group (ECOG) scale and 0-3 on the World Health Organization (WHO) scale.

3.4. Body composition measurements

The studies used manual, semi-automated and fully automated methods to assess CT-derived body composition. Software included Slice-O-Matic and in-house programs. Semi-automated segmentation was the most widely used approach. Tissue compartments were identified using predefined Hounsfield unit (HU) thresholds. Detailed measurement protocols were often lacking, limiting comparability. CT images were most commonly analyzed semi-automatically at L3-L5. The L3 vertebra was used in 70% (35/50) of studies and represented the standard segmentation approach.

Muscle quantity was primarily measured as skeletal muscle area on a single axial CT slice or averaged across multiple slices. Values were often normalized to height expressed as the skeletal muscle index. Ten studies (20%) focused on specific muscle groups, such as the psoas or paraspinal muscles, rather than total musculature [21–23,31,37,38,48,49,58,65]. Three studies (6%) used volumetric or whole-body muscle estimates [21,45,61].

Muscle quality was usually assessed by skeletal muscle radiodensity (HU), reflecting intramuscular fat infiltration (myosteatosis). Seven studies (14%) measured intramuscular adipose tissue [11,26,32,38,39, 45,50], primarily as cross-sectional area and in one case as whole-body volume.

Adipose tissue included visceral adipose tissue and subcutaneous adipose tissue, measured as cross-sectional areas, volumetric measures or whole-body estimates. Seven studies (14%) normalized fat measures to height [27,29,30,32,33,38,64].

Beyond these common metrics, studies evaluated additional measures. These included perirenal fat thickness [62], volumetric epicardial, paracardial, and thoracic adipose tissue [45]; indices of fat distribution such as visceral-to-subcutaneous fat ratio [9,26]; fat density [63]; and various fat–muscle ratios [26,28]. These measures broadened the scope of assessment but were often study-specific, highlighting limited methodological standardization.

3.5. Association between CT-derived body composition and survival outcomes

Survival outcomes included progression free survival (PFS), disease-free survival (DFS), recurrence-free survival (RFS), OS and mortality. Studies were categorized according to the CT-derived metric examined (muscle quantity, muscle quality, adipose tissue quantity, combined fat–muscle measures, and treatment-related changes). Table 1 summarizes associations between body composition measures and survival outcomes.

3.5.1. Muscle quantity and muscle quality

Associations between single-timepoint muscle quantity and survival were generally inconsistent. 21 retrospective studies assessed skeletal muscle area, skeletal muscle index, or whole-body muscle mass. Of these, six reported that lower muscle mass was significantly associated with worse OS, PFS, or DFS [9,29,30,32,42,45], whereas 15 found no significant relationship [20,21,24,26,28,38,39,43,44,46,47,53,55,59, 64]. Six retrospective studies evaluated psoas muscle quantity. Two reported significant associations between low muscle mass and worse survival [23,49], whereas four did not [21,37,38,58]. Methodological heterogeneity was substantial. Studies varied in anatomical landmarks (L3–L5), segmentation methods (manual vs semi-automatic), cut-off definitions for psoas muscle index (5.4-2.8 cm^2/m^2), and the use of study-specific psoas metrics [23,58,65]. Psoas measurements may also be intrinsically less reliable. Rutten et al. (2017) reported that psoas musculature may not represent total L3 muscle mass and may be influenced by degenerative spine diseases or local atrophy rather than cancer-related sarcopenia.

In contrast, studies assessing skeletal muscle area or skeletal muscle index were more homogeneous in measurement approach. Most studies

Table 1
Association between body composition measures and survival outcomes.

Body Composition Measure	Outcome	Association	Significant Association	No Association
Skeletal muscle quantity				
Skeletal muscle index	OS/PFS/ DFS	Low → Worse outcomes	5 studies/ 574 patients	13 studies/ 2218 patients
Skeletal muscle area	OS/PFS	N/A	0 studies	2 studies/ 152 patients
Psoas muscle quantity	OS/PFS/ Mortality	Low → Worse outcomes	2 studies/ 147 patients	3 studies/ 410 patients
Whole-body skeletal muscle volume	OS/PFS	Low → Worse outcomes	1 study/34 patients	0 studies
Skeletal muscle quality				
Skeletal muscle radiodensity	OS/PFS	Low → Worse Outcomes	5 studies/ 1145 patients	2 studies/ 195 patients
Skeletal muscle gauge	OS/PFS	Low → Poorer Outcomes	2 studies/ 576 patients	0 studies
Intramuscular adipose tissue	PFS	Low → Worse outcomes	1 study/34 patients	2 studies/ 125 patients
Adipose tissue quantity (excluding intramuscular adipose tissue)				
Visceral adipose tissue and visceral adipose tissue index	OS/PFS	High → Better outcome	1 study/133 patients	4 studies/ 1888 patients
Subcutaneous adipose tissue	OS/PFS	High → Worse outcomes	1 study/46 patients	3 studies/ 1949 patients
Combined subcutaneous and intramuscular adipose tissue	OS	High → Better outcome	1 study/82 patients	0 studies
Perirenal fat thickness	PFS	High → Worse outcomes	1 study/258 patients	0 studies
Epi and paracardial fat	PFS	High → Worse outcomes	1 study/34 patients	0 studies
Adipose tissue density				
Visceral fat density	OS	High → Worse outcomes	1 study/ 1249 patients	0 studies
Subcutaneous fat density	OS	High → Worse outcomes	1 study/ 1249 patients	0 studies
Adipose tissue distribution				
Visceral-to-subcutaneous adipose tissue ratio	OS	N/A	0 studies	1 study/31 patients
Joint fat-and-muscle compositions				
Fat-to-muscle Ratio	OS	High → Worse Outcomes	2 studies/ 332 patients	0 studies
Body composition phenotypes	Mortality/ OS/PFS	High fat and low muscle → Worse Outcomes	2 studies/ 1038 patients	0 studies
Body composition changes during treatment				
Skeletal muscle area, skeletal muscle index, or paraspinal muscle area	OS/DFS/ PFS/ Mortality	Loss → Worse outcomes	9 studies/ 1554 patients	2 studies/ 300
Psoas muscle	OS	N/A	0 studies	1 study/150 patients
Skeletal muscle radiodensity change	OS	Loss → Worse outcomes	1 study/88 patients	0 studies
Visceral adipose tissue	OS/PFS/ DFS	Loss → Worse Outcomes	2 studies/ patients	1 study/208 patients
Visceral adipose tissue	OS	Gain → Worse Outcomes	1 study/57 patients	
Subcutaneous adipose tissue	OS/DFS	N/A	1 study/58 patients	0 studies

used semi-automated L3 segmentation and skeletal muscle index cut-offs between 38.0 and 41.5 cm^2/m^2, with one outlier at 30.9 cm^2/m^2 [20]. However, patient populations differed across studies. Some included only advanced-stage disease (FIGO II–IV or III–IV), others all stages, and one focused on early-stage disease [29]. Treatment regimens also varied (NACT with IDS, PDS or mixed), and performance status was inconsistently reported. No clear pattern emerged when comparing studies with significant versus non-significant findings. Muscle quantity may not consistently show independent associations with survival. Its prognostic effect may be modest relative to dominant clinical variables such as stage, residual disease and performance status.

Although muscle quantity was not associated with survival in most studies, alternative metrics such as muscle quality, combined fat-muscle indices and treatment-related changes in muscle mass were more consistently associated. Eight retrospective studies evaluated muscle quality using skeletal muscle radiodensity or skeletal muscle gauge (mean radiodensity × skeletal muscle index). Six studies (n = 1574) showed that lower muscle quality was associated with poorer OS or PFS [32,43,46,51,52,64]. Two smaller studies (n = 61 and n = 134) found no statistically significant association [9,47], although in both, the effect consistently trended toward poorer survival among patients with low muscle quality. Two of the six studies reporting significant associations [51,52] showed potential cohort overlap; these were not interpreted as independent confirmatory evidence, and accounting for this overlap did not alter the overall pattern of associations.

Most studies included PDS cohorts and used semi-automated L3 segmentation. FIGO stage and performance status varied. Notably, all studies reporting significant associations between muscle quality and survival found weaker or non-significant associations for muscle mass. These findings suggest that muscle radiodensity, reflecting myosteatosis, may correlate more closely with functional status and frailty than muscle quantity alone. Huang et al. (2020) further reported that skeletal muscle gauge may provide stronger prognostic value than radiodensity alone, suggesting that combined metrics may be more informative.

3.5.2. *Combined fat-muscle measures and adipose tissue*

Four studies involving 1370 patients [11,26,28,65] consistently showed significant associations between combined fat-muscle metrics and survival. Although analytic approaches differed, each study integrated adiposity and muscle measures linking high fat and low muscle with worse survival. Davis et al. (2024) (n = 500) classified patients into body-composition phenotypes using L3 skeletal muscle index and multiple adipose tissue metrics. Cuello et al. (2023) (n = 538) used a study-specific metric combining the psoas-to-L4 vertebral body index with visceral adipose tissue. Both studies reported worse survival among patients classified as “obese and sarcopenic” (high adiposity, low muscle mass), “cachectic” (low adiposity, low muscle mass) or “obese” (normal muscle, high adiposity).

Two studies assessed fat-to-muscle ratios using more comparable methods. Despite differences in FIGO stage (I-IV vs III-IV) both used semi-automatic L3 segmentation, applied similar skeletal muscle index

cut-offs (38.7-39.0 cm^2/m^2) and included patients undergoing either PDS or IDS [26,28]. Both studies reported that elevated total or visceral fat-to-muscle ratios independently predicted worse OS, whereas skeletal muscle index alone did not. These findings contrasted with inconsistent results from ten studies assessing subcutaneous or visceral adipose tissue alone in relation to survival [9,28,30,45,50,54,56,57,62,63]. Together, these patterns suggest that adiposity and muscle mass may contribute independently to prognosis. When assessed separately, their effects may be attenuated in multivariable models. In contrast, combined metrics, whether phenotype- or ratio-based, appear to capture this interaction more effectively and yield more consistent associations.

A summary of findings related to adipose tissue and survival is provided in S5.

3.5.3. Treatment-related muscle loss

Eleven studies assessed treatment-related changes in muscle mass. Nine retrospective studies (n = 1554) reported that muscle loss was significantly associated with worse OS, DFS or PFS [24,25,27,31,33,34,37,39,60]. Two other studies (one retrospective, n = 88, one prospective, n = 212) found no statistically significant association [41,66]. In the smaller retrospective study, decline in muscle quality was associated with poorer survival, and both studies showed a trend toward worse survival with increasing muscle loss. Cohort overlap was identified between two of the studies reporting significant associations [37,39]; these were not considered independent confirmations of the observed association, and accounting for this overlap did not alter the overall pattern of findings.

Methodological heterogeneity was evident. Measurement approaches varied (skeletal muscle area, skeletal muscle index or volumetric measures), and definitions of muscle loss ranged from >0% to >4.2%. Studies also differed in treatment phase. Four evaluated changes during NACT [24,37,39,41], five during PDS followed by ACT [25,31,33,34,60] and two included both PDS + ACT and NACT + IDS [27,66].

Overall, treatment-related muscle loss showed more consistent associations with survival than single-timepoint muscle mass. Static assessments may not fully capture the physiological impact of cancer progression and treatment. In contrast, dynamic muscle loss likely captures cumulative burdens such as tumor-related inflammation, metabolic disruption, postoperative immobility and chemotherapy-related anorexia and fatigue. This may explain its stronger prognostic association.

3.6. Chemotherapy-related and surgical outcomes

Seven studies examined associations between CT-derived body composition and chemotherapy-related outcomes, encompassing muscle quantity, muscle quality, adipose tissue and treatment-related changes [44,45,53,55,56,63,64]. Findings were inconsistent. Both significant and non-significant associations were reported, and the direction of effects varied across metrics. Nine studies assessed body composition in relation to surgical outcomes [10,35,36,38,40,48,49,59,61]. Results were similarly mixed across muscle quantity, muscle quality, adipose tissue and treatment-related changes. Associations with surgical endpoints were inconsistent. Detailed overviews of chemotherapy-related and surgical outcomes are provided in Tables 2 and 3, respectively. Study-level descriptions are presented in S5.

3.7. Cut-off values

Cut-off values used to define sarcopenia, low muscle quality and visceral obesity varied widely. For sarcopenia based on skeletal muscle index, thresholds ranged from 30.9 to 41.5 cm^2/m^2, with 39.0 and 38.5 cm^2/m^2 most frequently applied. This likely reflects the influence of two widely cited sources. One is the sex-specific L3 skeletal muscle index cut-

Table 2
Association between body composition measures and chemotherapy-related outcomes.

Body Composition Measure	Outcome	Association	Significant Association	No Association
Skeletal muscle quantity				
Skeletal muscle index	Relative dose intensity/chemotherapy discontinuation	Low → Worse outcomes	1 study/173 patients	0 studies
Skeletal muscle index	chemotherapy dose reduction/dose delay/Neutropenia	N/A	0 studies	1 study/173
Skeletal muscle index	Chemotherapy toxicity	N/A	0 studies	2 studies/440 patients
Skeletal muscle area	Chemotherapy discontinuation	High → Worse outcomes	1 study/69 patients	0 studies
Psoas muscle index	Peripheral neuropathy	Low → Worse outcomes	1 study/76 patients	0 studies
Psoas muscle index	Neutropenia/thrombocytopenia	N/A	0 studies	1 study/76 patients
Whole-body skeletal muscle	Chemotherapy toxicity	N/A	0 studies	1 study/34 patients
Skeletal muscle quality				
Skeletal muscle radiodensity	Chemotherapy toxicity/treatment modifications	Low → Worse outcomes	1 study/239 patients	0 studies
Skeletal muscle radiodensity	Cycle delays	Low → Worse outcomes	1 study/69 patients	0 studies
Whole-body intramuscular adipose tissue	Chemotherapy toxicity	N/A	0 studies	1 study/34 patients
Adipose tissue				
Whole-body visceral adipose tissue	Chemotherapy toxicity	N/A	0 studies	1 study/34 patients
Whole-body subcutaneous adipose tissue	Chemotherapy toxicity	N/A	0 studies	1 study/34 patients
Visceral adipose tissue	Cycle delay	High → Worse outcomes	1 study/69 patients	0 studies
Visceral adipose tissue	Treatment efficacy	High → Worse outcomes	0 studies	1 study/1538 patients
Subcutaneous adipose tissue	Treatment efficacy	N/A	0 studies	1 study/1538 patients
Subcutaneous adipose tissue index	Chemotherapy toxicity/treatment modification	Low → Worse outcomes	1 study/239 patients	0 studies
Visceral fat density	Treatment response	Low → Worse outcomes	1 study/1249 patients	0 studies
Body composition changes during treatment				
Skeletal muscle index	Chemotherapy toxicity	Loss → Worse outcomes	1 study/212 patients	0 studies
Skeletal muscle radiodensity	Chemotherapy discontinuation	Loss → Worse outcomes	1 study/111 patients	0 studies

Table 3
Association between body composition measures and surgical outcomes.

Body Composition Measure	Outcome	Association	Significant Association	No Association
Skeletal muscle quantity				
Preoperative or pre-NACT skeletal muscle	Postoperative outcomes	N/A	0 studies	4 studies/ 838
Preoperative psoas muscle	Postoperative complications/ length of hospital stay	Low → Worse outcomes	2 studies/ 115 patients	1 study/ 216 patients
Preoperative skeletal muscle index	Surgery complexity	Low → Worse outcomes	1 study/ 174 patients	0 studies
Preoperative skeletal muscle index	Postoperative functional decline	N/A	0 studies	1 study/ 213 patients
Pre-NACT skeletal muscle volume	Rates of complete macroradical surgery	Low → Better outcomes	1 study/ 102 patients	0 studies
Post-NACT skeletal muscle volume	Rates of complete macroradical surgery	Low → Better outcomes	1 study/ 102 patients	0 studies
Skeletal muscle quality				
Preoperative skeletal muscle radiodensity	Postoperative complications	Low → Worse outcomes	1 study/ 213 patients	1 study/ 111 patients
Preoperative skeletal muscle radiodensity	Postoperative functional decline	Low → Worse outcomes	1 study/ 213 patients	0 studies
Adipose tissue				
Preoperative visceral adipose tissue	Postoperative complications	High → Worse outcomes	2 studies/ 428 patients	0 studies
Preoperative visceral adipose tissue	Rates of complete macroradical surgery	N/A	0 studies	1 study/ 102 patients
Preoperative subcutaneous adipose tissue	Rates of complete macroradical surgery	N/A	0 studies	1 study/ 102 patients
Combined subcutaneous and intramuscular adipose tissue	Length of hospital stay	Low → Worse outcomes	1 study/82 patients	0 studies
Body composition changes during treatment				
Skeletal muscle index change during NACT	Postoperative complications/ ICU admissions/ postoperative length of stay	Loss → Worse outcomes	1 study/ 174 patients	1 study/ 111 patients
Change in skeletal muscle radiodensity	Postoperative complications	Loss → Worse outcomes	1 study/ 111 patients	0 studies

off of 38.5 cm^2/m^2 for women derived from a cohort of obese patients with solid tumors [67]. The other is the 39.0 cm^2/m^2 threshold proposed by the international consensus panel on cancer cachexia [68]. Definitions of low muscle quality based on skeletal muscle radiodensity also differed, with attenuation cut-offs spanning from 21.2 to 41 HU. Visceral obesity thresholds ranged from 93 to 100 cm^2 of visceral adipose tissue area. These variations are summarized in Table 4. Overall, the wide range of cut-offs underscores the absence of standardized criteria for sarcopenia, myosteatosis, and visceral obesity in ovarian cancer research. Such heterogeneity likely contributes to inconsistent findings. Different thresholds may classify patients differently, reducing comparability and limiting detection of clinically meaningful associations.

4. Discussion and conclusion

4.1. Summary of key findings

This scoping review examined how CT-derived body composition metrics have been used to assess associations with clinical outcomes in EOC and the extent of methodological heterogeneity across studies. Across 50 included studies, muscle and adipose tissue were primarily quantified as cross-sectional areas on single axial CT slices or, less frequently, as volumetric measurements. Muscle quality was assessed using skeletal muscle radiodensity in HU. Most studies relied on semi-automatic L3 segmentation. Outcomes investigated included survival, chemotherapy-related, and surgical endpoints.

Certain domains, particularly muscle quality, combined fat-muscle metrics and treatment-related muscle loss, were more frequently associated with survival than single-timepoint measures of muscle mass or adipose tissue alone. In contrast, associations with chemotherapy-related and surgical outcomes were inconsistent.

Substantial methodological heterogeneity was identified across studies, including variation in body composition metrics, anatomical landmarks, segmentation approaches, patient populations, and cut-off definitions. These differences were mapped to identify potential influences on outcomes. However, no clear methodological pattern consistently explained variability in reported associations.

The consistent associations observed for combined fat–muscle metrics suggest that phenotype-based approaches may be more clinically informative than isolated metrics. By capturing the interplay between adiposity and muscle status, such approaches may better characterize distinct vulnerability profiles (e.g. cachectic, sarcopenic–obese or predominantly adipose) and inform tailored supportive or therapeutic strategies. In addition, studies that followed patients over time suggest that changes occurring during treatment may carry greater prognostic relevance than baseline measurements. This likely reflects the ability of longitudinal changes to capture the cumulative physiological impact of cancer progression and treatment. These observations support incorporating combined metrics and longitudinal assessment in future research.

These findings require cautious interpretation. Most studies were retrospective, and methodological heterogeneity limits certainty. Accordingly, findings should be regarded as hypothesis-generating rather than definitive.

4.2. Clinical relevance and feasibility

CT imaging is already part of routine care in EOC, presenting an opportunity to incorporate body composition analysis into radiology reports and pre-treatment planning. Currently, no frailty-screening tool reliably predicts clinical outcomes in EOC. Existing tools, such as the Geriatric 8 [69], rely on BMI and weight loss. Both measures may be misleading in the presence of ascites, which is common in EOC [70]. CT-derived body composition measures may in future contribute to a more reliable, ascites-independent assessment of frailty. With further prospective validation, body composition analysis could potentially support individualized treatment planning. This including surgical eligibility assessment and chemotherapy dosing considerations. In addition, monitoring of treatment-related muscle loss may help identify patients who could benefit from nutritional or physical rehabilitation interventions.

Although semi-automatic L3 segmentation was the dominant approach across included studies, its widespread clinical implementation may be limited by time and expertise requirements. Recent advances in automated and AI-assisted image analysis have improved the feasibility of routine assessment. These tools enable rapid and accurate

Table 4
Body composition cut off values across studies.

Measure:	Sarcopenia as skeletal muscle index (cm2/m2) below cut-off:									
Cut-off value	41,5	41	39,1	39	38,9	38,7	38,5	38	37	30,9
Number of studies applying the cut-off	1	4	1	10	1	3	6	1	1	1

Measure:	Low muscle quality as skeletal muscle radiodensity (HU) below cut-off								
Cut-off value	41	39	36,4	35,5	33,7	32	26,1	22,6	21,2
Number of studies applying the cut-off	1	1	1	1	1	2	1	1	1

Measure:	Visceral obesity as visceral adipose tissue (cm^2) below cut-off	
Cut-off value	100	93
Number of studies applying the cut-off	3	1

Variability in cut-off values used to define sarcopenia, low muscle quality, and visceral obesity across included studies.

extraction of muscle and adipose tissue metrics with minimal human input. Integration into radiology workflows could facilitate automated body composition reporting at the point of care, providing a scalable approach that leverages routinely acquired imaging data.

4.3. Gaps in the literature and future directions

Future work should align with ongoing consensus efforts such as the Global Leadership Initiative on Sarcopenia (GLIS). GLIS recently proposed a global conceptual definition of sarcopenia incorporating three core components: muscle mass, muscle strength and muscle-specific strength [71]. Within this framework, CT-derived measures reflect only the morphological component and do not directly assess muscle function or strength. GLIS is now working toward operational definitions and cut-off points for sarcopenia. Harmonized CT-based measures of muscle mass could contribute to these efforts, provided methodological challenges are addressed. Several technical and biological challenges currently limit harmonization of CT-derived muscle and adipose tissue measures. HU thresholds used to define skeletal muscle vary considerably, with lower limits ranging from 0 to −29 HU and upper limits from 100 to 200 HU [72]. CT acquisition parameters, including phase and contrast specifications, are inconsistently reported [32]. While contrast does not affect skeletal muscle index, it significantly increases muscle radiodensity and reduces estimated fat mass [73]. In ovarian cancer, malignant ascites may overlap in density with adipose tissue, leading to misclassification of visceral fat [61]. Bowel contents may also fall within HU thresholds used for fat segmentation, distorting measurements [28].

A more coherent operational framework could enable future studies to evaluate targeted interventions, such as combined exercise and nutritional strategies. Such interventions may modify high-risk body composition profiles and potentially improve survival and reduce treatment toxicity.

4.4. Strengths and limitations

This review adhered to JBI methodology and PRISMA-ScR guidelines, and the search strategy was developed and peer-reviewed by information specialists. Study selection and data extraction were conducted independently by two reviewers.

Several limitations affect interpretation of the findings. Vote counting was used as a descriptive approach to summarize the direction and statistical significance of associations in a heterogeneous evidence base. It does not weight studies by methodological rigor, effect size, sample size, statistical precision, or risk of bias. As no formal risk-of-bias assessment was conducted, small retrospective studies with greater susceptibility to bias may contribute to the observed patterns alongside large, well-adjusted cohorts. This approach therefore risks being overinterpreted. While vote counting can identify recurring patterns, it cannot infer the strength or certainty of evidence. Substantial methodological heterogeneity further limited comparability and confidence in the observed patterns. Findings should therefore be regarded as hypothesis-generating.

Only English-language publications were included, and although three major databases were searched, sources such as Scopus, CINAHL and grey literature databases were not included. This may have limited comprehensiveness.

Most included studies were retrospective and based on previously recorded clinical and imaging data rather than prospectively designed investigations. This weakens the strength of the evidence by increasing susceptibility to selection bias, inconsistent or incomplete covariate recording, heterogeneous outcome definitions, and residual confounding. Associations between body composition and clinical outcomes should be interpreted within a broader clinical context, in which factors such as disease stage, treatment pathway, performance status, and ascites may influence both measurements and clinical outcomes. Accordingly, the observed patterns may partly reflect these underlying clinical factors rather than direct effects of body composition. Retrospective designs are better suited to identifying prognostic signals than to supporting causal inference or clinical implementation.

Taken together, these limitations underscore that the identified patterns should be interpreted cautiously and regarded as hypothesis-generating rather than definitive.

This review highlights both the promise and current limitations of CT-derived body composition assessment in EOC. Muscle quality, combined fat–muscle metrics, and treatment-related muscle loss appear to be the most informative prognostic domains, but substantial methodological heterogeneity hinders definitive interpretation. Future progress will depend on harmonized measurement protocols and alignment with consensus frameworks such as GLIS. Prospective studies are also needed to determine whether modifiable body composition features are associated with clinically meaningful endpoints. As CT is already embedded in routine care, standardized and automated analytic approaches may eventually enable body composition assessment to support risk stratification and individualized treatment planning.

5. Conclusion and future perspectives

Despite substantial methodological heterogeneity, this scoping review suggests that CT-derived body composition may have prognostic relevance in EOC. Muscle quality, combined fat–muscle metrics, and treatment-related muscle loss demonstrated the most consistent associations with survival. These findings should be regarded as hypothesis-generating given the retrospective and heterogeneous evidence base. Standardized measurement protocols and consensus cut-offs are needed to strengthen the evidence base and enable clinical translation. As methodological consensus, automated imaging tools and prospective validation efforts advance, CT-derived body composition assessment may have a future role in precision oncology in EOC. It may eventually support risk stratification, treatment planning, and early identification

of patients who could benefit from targeted supportive interventions.

CRediT authorship contribution statement

Nikolaj Ohm: Conceptualization; Formal Analysis; Investigation; Writing – Original Draft Preparation; Writing – Review & Editing. Maria Møller Andersen: Conceptualization; Investigation; Formal Analysis. Jakob Ohm Oreskov: Conceptualization; Formal Analysis; Writing – Review & Editing. Claus Høgdall: Conceptualization; Formal Analysis; Writing – Review & Editing. Tine Henrichsen Schnack: Conceptualization; Formal Analysis; Writing – Review & Editing.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used ChatGPT (OpenAI) to improve readability and language. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ejso.2026.111888.

References

[1] Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2024;74(3):229–63. https://doi.org/10.3322/caac.21834.

[2] Danish Gynecological Cancer Group. Instructions for ovarian cancer: epidemiology, hereditary factors, screening, disease course, staging, and survival. https://www.dgcg.dk/images/retningslinier/Ovariecancer/DGCG_epidemiologi_c_ovarii_v1.1_AdmGodk_3005224704.pdf. [Accessed 12 March 2025].

[3] Danish Gynecological Cancer Database. Nationwide clinical database for gynecological cancer: national annual report 2014/2015. https://www.dgcg.dk/images/rsrapport_DGCD_2014-15.pdf. [Accessed 12 March 2025].

[4] Sørensen SM, Schnack TH, Høgdall C. Impact of residual disease on overall survival in women with Federation of Gynecology and Obstetrics stage IIIB–IIIC vs stage IV epithelial ovarian cancer after primary surgery. Acta Obstet Gynecol Scand 2018;97(10):1330–7. https://doi.org/10.1111/aogs.13453.

[5] Weng A, Henrichsen T, Calundann M, Weng Ekmann-Gade A, Henrichsen Schnack T, Seibaek L, et al. Impact of surgery and chemotherapy timing on outcomes in older versus younger epithelial ovarian cancer patients: a nationwide Danish cohort study. J Geriatr Oncol 2023;14(1):101359. https://doi.org/10.1016/j.jgo.2022.08.008.

[6] Daviu Cobián C, Oreskov JO, Blaakaer J, Jespersen E, Jørgensen TL, Ryg J, et al. Impact of frailty screening and geriatric assessment and intervention in older patients with epithelial ovarian cancer: a multicenter randomized clinical trial protocol (FRAGINOC). J Geriatr Oncol 2024;15(3):101713. https://doi.org/10.1016/j.jgo.2024.101713.

[7] Fielding RA, Vellas B, Evans WJ, Bhasin S, Morley JE, Newman AB, et al. Sarcopenia: an undiagnosed condition in older adults. Current consensus definition: prevalence, etiology, and consequences. J Am Med Dir Assoc 2011;12(4):249–56. https://doi.org/10.1016/j.jamda.2011.01.003.

[8] Mourtzakis M, Prado CMM, Lieffers JR, Reiman T, McCargar LJ, Baracos VE. A practical and precise approach to quantification of body composition in cancer patients using computed tomography images acquired during routine care. Appl Physiol Nutr Metab 2008;33(5):997–1006. https://doi.org/10.1139/H08-075.

[9] Gadelhak BN, Tawfik AM, Batouty NM, Sobh DM, Refky B, Gaballah K, et al. Sarcopenia and CT body composition as a prognostic factor in ovarian cancer patients prior to interval debulking surgery. Indian J Gynecol Oncol 2024;22(4):150. https://doi.org/10.1007/s40944-024-00905-x.

[10] Nie X, Zhang L, Meng H, Zhong Y, Jiang Y, Chen T, et al. Visceral obesity determined by CT as a predictor of short-term postoperative complications in patients with ovarian cancer. Arch Gynecol Obstet 2024;309(4):1491–8. https://doi.org/10.1007/s00404-023-07206-2.

[11] Davis EW, Attwood K, Prunier J, Paragh G, Joseph JM, Klein A, et al. The association of body composition phenotypes before chemotherapy with epithelial ovarian cancer mortality. J Natl Cancer Inst 2024;116(9):1513–24. https://doi.org/10.1093/jnci/djae112.

[12] Rinninella E, Fagotti A, Cintoni M, Raoul P, Scaletta G, Scambia G, et al. Skeletal muscle mass as a prognostic indicator of outcomes in ovarian cancer: a systematic review and meta-analysis. Int J Gynecol Cancer 2020;30:654–63. https://doi.org/10.1136/ijgc-2020-001215.

[13] Rizzo S, Raia G, Del Grande M, Gasparri ML, Colombo I, Manganaro L, et al. Body composition as a predictor of chemotherapy-related toxicity in ovarian cancer patients: a systematic review. Frontiers in oncology, 12. Frontiers Media S.A; 2022. https://doi.org/10.3389/fonc.2022.1057631.

[14] Gadducci A, Cosio S. The prognostic relevance of computed tomography-assessed skeletal muscle index and skeletal muscle radiation attenuation in patients with gynecological cancer. Anticancer Res 2021;41:9–20. https://doi.org/10.21873/anticanres.14747.

[15] Jin Y, Ma X, Yang Z, Zhang N. Low L3 skeletal muscle index associated with the clinicopathological characteristics and prognosis of ovarian cancer: a meta-analysis. J Cachexia Sarcopenia Muscle 2023;14:697–705. https://doi.org/10.1002/jcsm.13175.

[16] Aromataris E, Lockwood C, Porritt K, Pilla B, Jordan Z, editors. JBI manual for evidence synthesis. JBI; 2024. https://doi.org/10.46658/JBIMES-24-01. https://synthesismanual.jbi.global. [Accessed 12 March 2025].

[17] Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med 2018;169(7):467–73. https://doi.org/10.7326/M18-0850.

[18] Covidence systematic review software, Veritas Health Innovation, Melbourne, Australia. Available at: www.covidence.org, (accessed 11 December 2024).

[19] Campbell M, McKenzie JE, Sowden A, Katikireddi SV, Brennan SE, Ellis S, et al. Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline. Br Med J 2020;368:l6890. https://doi.org/10.1136/bmj.l6890.

[20] Nakayama N, Nakayama K, Nakamura K, Razia S, Kyo S. Sarcopenic factors may have no impact on outcomes in ovarian cancer patients. Diagnostics (Basel) 2019;9(4):206. https://doi.org/10.3390/diagnostics9040206.

[21] Matsubara Y, Nakamura K, Matsuoka H, Ogawa C, Masuyama H. Pre-treatment psoas major volume is a predictor of poor prognosis for patients with epithelial ovarian cancer. Mol Clin Oncol 2019;11(4):376–82. https://doi.org/10.3892/mco.2019.1912.

[22] Yoshikawa T, Takano M, Miyamoto M, Yajima I, Shimizu Y, Aizawa Y, et al. Psoas muscle volume as a predictor of peripheral neurotoxicity induced by primary chemotherapy in ovarian cancers. Cancer Chemother Pharmacol 2017;80(3):555–61. https://doi.org/10.1007/s00280-017-3395-5.

[23] Yoshikawa T, Miyamoto M, Aoyama T, Matsuura H, Iwahashi H, Ishibashi H, et al. Psoas muscle index at the fifth lumbar vertebra as a predictor of survival in epithelial ovarian cancers. Mol Clin Oncol 2021;15(3):177. https://doi.org/10.3892/mco.2021.2339.

[24] Yoshino Y, Taguchi A, Nakajima Y, Takao M, Kashiyama T, Furusawa A, et al. Extreme skeletal muscle loss during induction chemotherapy is an independent predictor of poor survival in advanced epithelial ovarian cancer patients. J Obstet Gynaecol Res 2020;46(12):2662–71. https://doi.org/10.1111/jog.14516.

[25] Nakayama N, Nakayama K, Ishibashi T, Katayama S, Kyo S. Effect of muscle loss but not fat loss during primary debulking surgery and chemotherapy on prognosis of patients with ovarian cancer. J Clin Med 2022;11(11):3184. https://doi.org/10.3390/jcm11113184.

[26] Kim SI, Kim TM, Lee M, Kim HS, Chung HH, Cho JY, et al. Impact of CT-determined sarcopenia and body composition on survival outcome in patients with advanced-stage high-grade serous ovarian carcinoma. Cancers (Basel) 2020;12(3):559. https://doi.org/10.3390/cancers12030559.

[27] Kim SI, Yoon S, Kim TM, Cho JY, Chung HH, Song YS. Prognostic implications of body composition change during primary treatment in patients with ovarian cancer: a retrospective study using an artificial intelligence-based volumetric technique. Gynecol Oncol 2021;162(1):72–9. https://doi.org/10.1016/j.ygyno.2021.05.004.

[28] Ham S, Choi JH, Shin SG, Lee EJ. High visceral fat-to-muscle ratio is an independent factor that predicts worse overall survival in patients with primary epithelial ovarian, fallopian tube, and peritoneal cancer. J Ovarian Res 2023;16(1):19. https://doi.org/10.1186/s13048-023-01098-1.

[29] Chae SH, Lee C, Yoon SH, Shim SH, Lee SJ, Kim SN, et al. Sarcopenia as a predictor of prognosis in early stage ovarian cancer. J Kor Med Sci 2021;36(1):e2. https://doi.org/10.3346/jkms.2021.36.e2.

[30] Guo X, Tang J, He H, Jian L, Qiang O, Xie Y. Body composition and inflammation variables as the potential prognostic factors in epithelial ovarian cancer treated with olaparib. Front Oncol 2024;14:1359635. https://doi.org/10.3389/fonc.2024.1359635.

[31] Wang X, Zhang C, Cao F, Wang CB, Dong JN, Wang ZH. Nomogram of combining CT-based body composition analyses and prognostic inflammation score: prediction of survival in advanced epithelial ovarian cancer patients. Acad Radiol 2022;29(9):1394–403. https://doi.org/10.1016/j.acra.2021.11.011.

[32] Huang CY, Sun FJ, Lee J. Prognostic value of muscle measurement using the standardized phase of computed tomography in patients with advanced ovarian cancer. Nutrition 2020;72:110642. https://doi.org/10.1016/j.nut.2019.110642.
[33] Huang CY, Yang YC, Chen TC, Chen JR, Chen YJ, Wu MH, et al. Muscle loss during primary debulking surgery and chemotherapy predicts poor survival in advanced-stage ovarian cancer. J Cachexia Sarcopenia Muscle 2020;11(2):534–46. https://doi.org/10.1002/jcsm.
[34] Lee J, Weng CS, Chang CL, Hsu WH, Jan YT, Wu KP. Association of prognostic nutritional index with muscle loss and survival in patients with ovarian cancer treated with primary debulking surgery and chemotherapy. Support Care Cancer 2023;31(5):267. https://doi.org/10.1007/s00520-023-07719-1.
[35] van der Zanden V, van Soolingen NJ, Viddeleer AR, Trum JW, Amant F, Mourits MJE, et al. Low preoperative skeletal muscle density is predictive for negative postoperative outcomes in older women with ovarian cancer. Gynecol Oncol 2021;162(2):360–7. https://doi.org/10.1016/j.ygyno.2021.05.039.
[36] Heus C, Smorenburg A, Stoker J, Rutten MJ, Amant FCH, van Lonkhuijzen LRCW. Visceral obesity and muscle mass determined by CT scan and surgical outcome in patients with advanced ovarian cancer: a retrospective cohort study. Gynecol Oncol 2021;160(1):187–92. https://doi.org/10.1016/j.ygyno.2020.10.015.
[37] Rutten IJG, Ubachs J, Kruitwagen RFPM, Beets-Tan RGH, Olde Damink SWM, Van Gorp T. Psoas muscle area is not representative of total skeletal muscle area in the assessment of sarcopenia in ovarian cancer. J Cachexia Sarcopenia Muscle 2017;8(4):630–8. https://doi.org/10.1002/jcsm.12180.
[38] Rutten IJG, Ubachs J, Kruitwagen RFPM, van Dijk DPJ, Beets-Tan RGH, Massuger LFAG, et al. The influence of sarcopenia on survival and surgical complications in ovarian cancer patients undergoing primary debulking surgery. Eur J Surg Oncol 2017;43(4):717–24. https://doi.org/10.1016/j.ejso.2016.12.016.
[39] Rutten IJG, van Dijk DPJ, Kruitwagen RFPM, Beets-Tan RGH, Olde Damink SWM, Van Gorp T. Loss of skeletal muscle during neoadjuvant chemotherapy is related to decreased survival in ovarian cancer patients. J Cachexia Sarcopenia Muscle 2016;7(4):458–66. https://doi.org/10.1002/jcsm.12107.
[40] van der Zanden V, van Soolingen NJ, Viddeleer AR, Trum JW, Amant F, Mourits MJE, et al. Loss of skeletal muscle density during neoadjuvant chemotherapy in older women with advanced stage ovarian cancer is associated with postoperative complications. Eur J Surg Oncol 2022;48(4):896–902. https://doi.org/10.1016/j.ejso.2021.10.015.
[41] Ubachs J, Koole SN, Lahaye M, Fabris C, Bruijs L, van LJS, et al. No influence of sarcopenia on survival of ovarian cancer patients in a prospective validation study. Gynecol Oncol 2020;159(3):706–11. https://doi.org/10.1016/j.ygyno.2020.09.042.
[42] Bronger H, Hederich P, Hapfelmeier A, Metz S, Noël PB, Kiechle M, et al. Sarcopenia in advanced serous ovarian cancer. Int J Gynecol Cancer 2017;27(2):223–32. https://doi.org/10.1097/igc.0000000000000867.
[43] Ataseven B, Luengo TG, du Bois A, Waltering KU, Traut A, Heitz F, et al. Skeletal muscle attenuation (sarcopenia) predicts reduced overall survival in patients with advanced epithelial ovarian cancer undergoing primary debulking surgery. Ann Surg Oncol 2018;25(11):3372–9. https://doi.org/10.1245/s10434-018-6683-3.
[44] Del Grande M, Rizzo S, Nicolino GM, Colombo I, Rossi L, Manganaro L, et al. Computed tomography-based body composition in patients with ovarian cancer: association with chemotoxicity and prognosis. Front Oncol 2021;11:718815. https://doi.org/10.3389/fonc.2021.718815.
[45] Raia G, Del Grande M, Colombo I, Nerone M, Manganaro L, Gasparri ML, et al. Whole-body composition features by computed tomography in ovarian cancer: pilot data on survival correlations. Cancers (Basel) 2023;15(9):2602. https://doi.org/10.3390/cancers15092602.
[46] Aust S, Knogler T, Pils D, Obermayr E, Reinthaller A, Zahn L, et al. Skeletal muscle depletion and markers for cancer cachexia are strong prognostic factors in epithelial ovarian cancer. PLoS One 2015;10(10):e0140403. https://doi.org/10.1371/journal.pone.0140403.
[47] Gadducci A, Simonetti E, Mezzapesa F, Cosio S, Miccoli M, Frey J, et al. Computed tomography-assessed skeletal muscle index and skeletal muscle radiation attenuation in patients with ovarian cancer treated with primary surgery followed by platinum-based chemotherapy: a single-center Italian study. Anticancer Res 2022;42(2):947–54. https://doi.org/10.21873/anticanres.15554.
[48] Mercan U, Gulpinar B, Ersen O, Kosmaz K, Durhan A, Unal AE. Impact of muscle mass depletion on surgical outcomes in patients with primary high-grade serous ovarian cancer undergoing CRS and HIPEC. J Coll Physician Surg Pak 2021;31(11):1314–9. https://doi.org/10.29271/jcpsp.2021.11.1314.
[49] Can E, Sönmez S, Konal M, Şirinoglu HA, Seyhan NA, Akbayır Ö. Does sarcopenia predict perioperative mortality in patients with advanced ovarian cancer? Eur Rev Med Pharmacol Sci 2022;26(24):9409–15. https://doi.org/10.26355/eurrev_202212_30692.
[50] Nattenmüller J, Rom J, Buckner T, Arvin J, Bau B, Sohn C, et al. Visceral abdominal fat measured by computer tomography as a prognostic factor for gynecological malignancies? Oncotarget 2018;9(23):16330–42. https://doi.org/10.18632/oncotarget.24667.
[51] Kumar A, Moynagh MR, Multinu F, Cliby WA, McGree ME, Weaver AL, et al. Muscle composition measured by CT scan is a measurable predictor of overall survival in advanced ovarian cancer. Gynecol Oncol 2016;142(2):311–6. https://doi.org/10.1016/j.ygyno.2016.05.027.
[52] Polen-De C, Fadadu P, Weaver AL, Moynagh M, Takahashi N, Jatoi A, et al. Quality is more important than quantity: pre-operative sarcopenia is associated with poor survival in advanced ovarian cancer. Int J Gynecol Cancer 2022;32(10):1289–96. https://doi.org/10.1136/ijgc-2022-003387.
[53] Staley SA, Tucker K, Newton M, Ertel M, Oldan J, Doherty I, et al. Sarcopenia as a predictor of survival and chemotoxicity in patients with epithelial ovarian cancer receiving platinum and taxane-based chemotherapy. Gynecol Oncol 2020;156(3):695–700. https://doi.org/10.1016/j.ygyno.2020.01.003.
[54] Torres ML, Hartmann LC, Cliby WA, Kalli KR, Young PM, Weaver AL, et al. Nutritional status, CT body composition measures and survival in ovarian cancer. Gynecol Oncol 2013;129(3):548–53. https://doi.org/10.1016/j.ygyno.2013.03.003.
[55] Shah R, Polen-De C, McGree M, Fought A, Kumar A. Re-Evaluating chemotherapy dosing strategies for ovarian cancer: impact of sarcopenia. Curr Oncol 2023;30(11):9501–13. https://doi.org/10.3390/curroncol30110688.
[56] Wade KNS, Brady MF, Thai T, Wang Y, Zheng B, Salani R, et al. Measurements of adiposity as prognostic biomarkers for survival with anti-angiogenic treatment in epithelial ovarian cancer: an NRG oncology/gynecologic oncology group ancillary data analysis of GOG 218. Gynecol Oncol 2019;155(1):69–74. https://doi.org/10.1016/j.ygyno.2019.07.020.
[57] Slaughter KN, Thai T, Penaroza S, Benbrook DM, Thavathiru E, Ding K, et al. Measurements of adiposity as clinical biomarkers for first-line bevacizumab-based chemotherapy in epithelial ovarian cancer. Gynecol Oncol 2014;133(1):11–5. https://doi.org/10.1016/j.ygyno.2014.01.031.
[58] Conrad LB, Awdeh H, Acosta-Torres S, Conrad SA, Bailey AA, Miller DS, et al. Pre-operative core muscle index in combination with hypoalbuminemia is associated with poor prognosis in advanced ovarian cancer. J Surg Oncol 2018;117(5):1020–8. https://doi.org/10.1002/jso.24990.
[59] Wood N, Morton M, Shah SN, Yao M, Barnard H, Tewari S, et al. Association between CT-based body composition assessment and patient outcomes during neoadjuvant chemotherapy for epithelial ovarian cancer. Gynecol Oncol 2023;169:55–63. https://doi.org/10.1016/j.ygyno.2022.11.024.
[60] Polen-De C, Giri S, Fadadu P, Weaver A, Mcgree ME, Moynagh M, et al. Muscle loss during cancer therapy is associated with poor outcomes in advanced ovarian cancer. J Natl Cancer Inst Monogr 2023;2023(61):43–8. https://doi.org/10.1093/jncimonographs/lgad007.
[61] Vitarello J, Goncalves MD, Zhou QC, Iasonos A, Halpenny DF, Plodkowski A, et al. The effects of neoadjuvant chemotherapy and interval debulking surgery on body composition in patients with ovarian cancer. JCSM Clin Rep 2021;6(1):11–6. https://pmc.ncbi.nlm.nih.gov/articles/PMC8415724/.
[62] Zhang Y, Coletta AM, Allen PK, Parikh AM, Cox-Mattin M, Meyer LA, et al. Perirenal adiposity is associated with lower progression-free survival from ovarian cancer. Int J Gynecol Cancer 2018;28(2):285–92. https://doi.org/10.1097/igc.0000000000001165.
[63] Buechel ME, Enserro D, Burger RA, Brady MF, Wade K, Secord AA, et al. Correlation of imaging and plasma based biomarkers to predict response to bevacizumab in epithelial ovarian cancer (EOC). Gynecol Oncol 2021;161(2):382–8. https://doi.org/10.1016/j.ygyno.2021.02.032.
[64] Bruno KA, J S da SM, Chaves GV. Association of body composition with toxicity to first-line chemotherapy and three-year survival in women with ovarian adenocarcinoma. Acta Oncol 2021;60(12):1611–20. https://doi.org/10.1080/0284186x.2021.1983210.
[65] Cuello MA, Gómez F, Wichmann I, Suárez F, Kato S, Orlandini E, et al. Body composition and metabolic dysfunction really matter for the achievement of better outcomes in high-grade serous ovarian cancer. Cancers (Basel) 2023;15(4). https://doi.org/10.3390/cancers15041156.
[66] Schofield C, Lopez P, Cohen PA, Taaffe DR, Newton RU, Galvão DA, et al. Skeletal muscle morphology in patients receiving primary versus interval cytoreductive surgery for advanced high-grade serous ovarian cancer. Int J Gynecol Cancer 2023;33(10):1587–94. https://doi.org/10.1136/ijgc-2023-004425.
[67] Prado CM, Lieffers JR, McCargar LJ, Reiman T, Sawyer MB, Martin L, et al. Prevalence and clinical implications of sarcopenic obesity in patients with solid tumours of the respiratory and gastrointestinal tracts: a population-based study. Lancet Oncol 2008;9(7):629–35. https://doi.org/10.1016/S1470-2045(08)70153-0.
[68] Raff S, Rome I, Baracos VE, Fearon K, Strasser F, Anker SD, et al. Definition and classification of cancer cachexia: an international consensus. Lancet Oncol 2011;12(5):489–95. https://doi.org/10.1016/S1470-2045(10)70218-7.
[69] Bellera CA, Rainfray M, Mathoulin-Pélissier S, Mertens C, Delva F, Fonck M, et al. Screening older cancer patients: first evaluation of the G-8 geriatric screening tool. Ann Oncol 2012;23(8):2166–72. https://doi.org/10.1093/annonc/mdr587.
[70] Huang H, Li YJ, Lan CY, Huang QD, Feng YL, Huang YW, et al. Clinical significance of ascites in epithelial ovarian cancer. Neoplasma 2013;60(5):546–52. https://doi.org/10.4149/neo_2013_071.
[71] Kirk B, Cawthon PM, Arai H, Ávila-Funes JA, Barazzoni R, Bhasin S, et al. The conceptual definition of sarcopenia: delphi consensus from the global leadership initiative in Sarcopenia (GLIS). Age Ageing 2024;53(3):afae052. https://doi.org/10.1093/ageing/afae052.
[72] Aubrey J, Esfandiari N, Baracos VE, Buteau FA, Frenette J, Putman CT, et al. Measurement of skeletal muscle radiation attenuation and basis of its biological variation. Acta Physiol (Oxf) 2014;210(3):489–97. https://doi.org/10.1111/apha.12224.
[73] Rollins KE, Javanmard-Emamghissi H, Awwad A, Macdonald IA, Fearon KCH, Lobo DN. Body composition measurement using computed tomography: does the phase of the scan matter? Nutrition 2017 Sep 1;41:37–44. https://doi.org/10.1016/j.nut.2017.02.011.