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BIOELECTRICAL IMPEDANCE ANALYSIS FOR THE ASSESSMENT OF BODY COMPOSITION IN ONCOLOGY : A SCOPING REVIEW

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INTRODUCTION

Bioelectrical Impedance Analysis (BIA) has emerged as a reliable, non-invasive, objective and cost-effective method showing high reproducibility and requiring little training for the equipment to be used [1]. Furthermore, recent studies have suggested potential benefits of BIA and BIA-derived measures for body composition assessment in cancer patients [2,3], thus with clinical relevance.

AIM

This scoping review aims to evaluate the current scientific and clinical evidence for BIA for body composition assessment in patients with cancer, and under active treatment.

METHODS

Literature search was conducted through MEDLINE, CINAHL, Scopus and Web of Science, following PRISMA Guidelines [4]. Included studies were written in English, conducted in adults, concerning all cancer types, using BIA assessment, and published between 2011 and 2021. Studies in benign pathology or only assessing nutritional status were excluded. Two reviewers independently screened the titles and abstracts of included studies using Rayyan. Conflicts were discussed and resolved between the two reviewers. After full-text screening, study selection was conducted.

RESULTS

From the initially retrieved 2070 studies, 51 were eligible and 36 were included in this scoping review: 18 prospective [5-22], 11 systematic reviews [1,3, 23-31], 6 cross-sectional [32-37] and 1 retrospective [38,].

Population size for the included original articles ranged from 18 to 1217 participants, comprising a total of 3015 cancer patients with a mean baseline BMI ranging from 20.3 to 30.0 kg/m2 and mean age ranging between 47 and 70 years. Review articles included 273 studies, encompassing 78 350 participants.

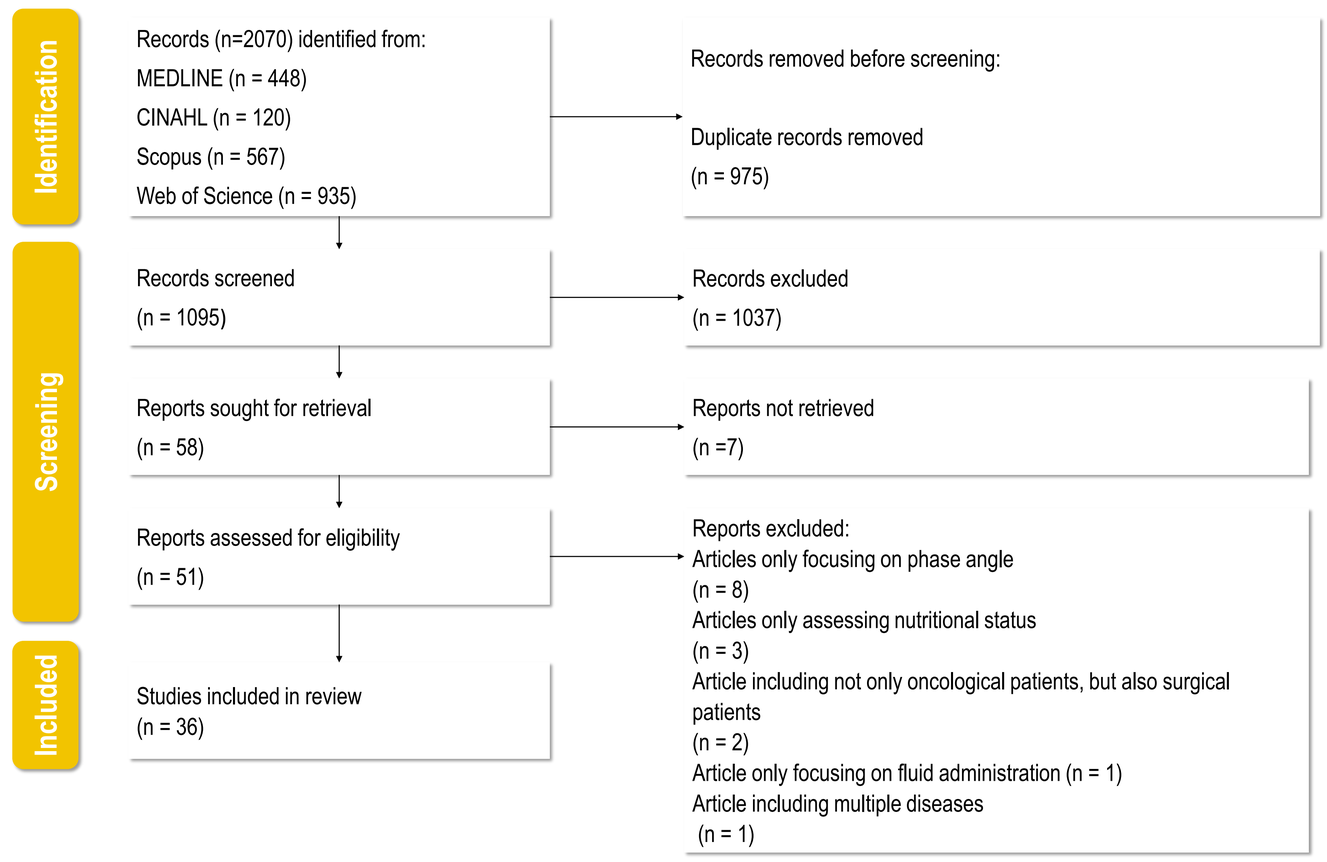

Figure 1. Flow diagram of included studies, according to PRISMA 2020 Guidelines.[4]

The 36 studies considered in this review reported patients with head and neck cancer (n=8) [5-8, 22, 23, 25, 27], breast cancer (n=4) [14, 28, 33. 37], esophageal cancer (n=2) [9, 29], liver cancer (n=2) [10, 12], pancreatic cancer (n=2)) [11, 30], gastric cancer (n=2) [31, 34], colorectal cancer (n=7) [13, 15-18, 21, 38], lung cancer (n=1) [35], skin cancer (n=1) [32] and multiple cancer types (n=7) [1, 3, 19, 20, 24, 26, 36].

Breast cancer
- -Consistently overestimated FFM. [33]
- -Could provide more concrete and objective results. [14]

Head and neck cancer
- -Acceptable tool for assessment of FFM [6] and valuable in malnutrition diagnosis. [22]
- -High sensitivity and specificity. [5]
- -BIA-PA and BIVA seemed to be useful screening tools. [7]
- -Can be of clinical value in preoperative risk evaluation and might reduce complications and hospital stay. [8]

Liver cancer
- -Could provide additional clinical information regarding postoperative complications. [12]
- -Suitable method for assessing changes in body composition. [10]

Gastric cancer
- -Visceral fat area measured by CT and BIA showed significant correlation and satisfactory reliability. [34]

Esophageal cancer
- -BIA-LMV was an important prognostic indicator. [9]

Pancreatic cancer
- -May be useful for nutritional assessment in patients who have undergone surgery. [11]

Colorectal cancer
- -Represent a non-invasive and cost-effective tool [13]
- -Both BIA-devices show acceptable ability to detect low FFM. [21]
- -Low muscle and fat indices measured by BIA may be related to poor prognosis. [38]
- -Successfully identifies differences in body composition depending on cancer stage.[18]

Multiple cancer types
- -Easy and effective method for assessing body composition and its change in patients undergoing major surgery. [19]
- -Has limited use in advanced cancer patients as well as in breast cancer patients. [21]
- -Serves as an objective, reliable, and non-invasive method. [26]
- -May be useful in predicting the risk of complications following elective cancer surgery. [24]

Lung cancer
- -Overestimated MM and underestimated FM with limits of agreement. [35]

CONCLUSIONS

The findings of this scoping review suggest that BIA-derived measures, particularly fat-free mass (FFM), Phase Angle (PA) and Bioelectrical Impedance Vector Analysis (BIVA), have shown a good potential and relevant clinical value in preoperative risk evaluation, postoperative complications and hospital length of stay, and as important prognostic markers in cancer patients. BIA seems to be a valid method for the assessment of body composition and related hazards in oncology.

REFERENCES