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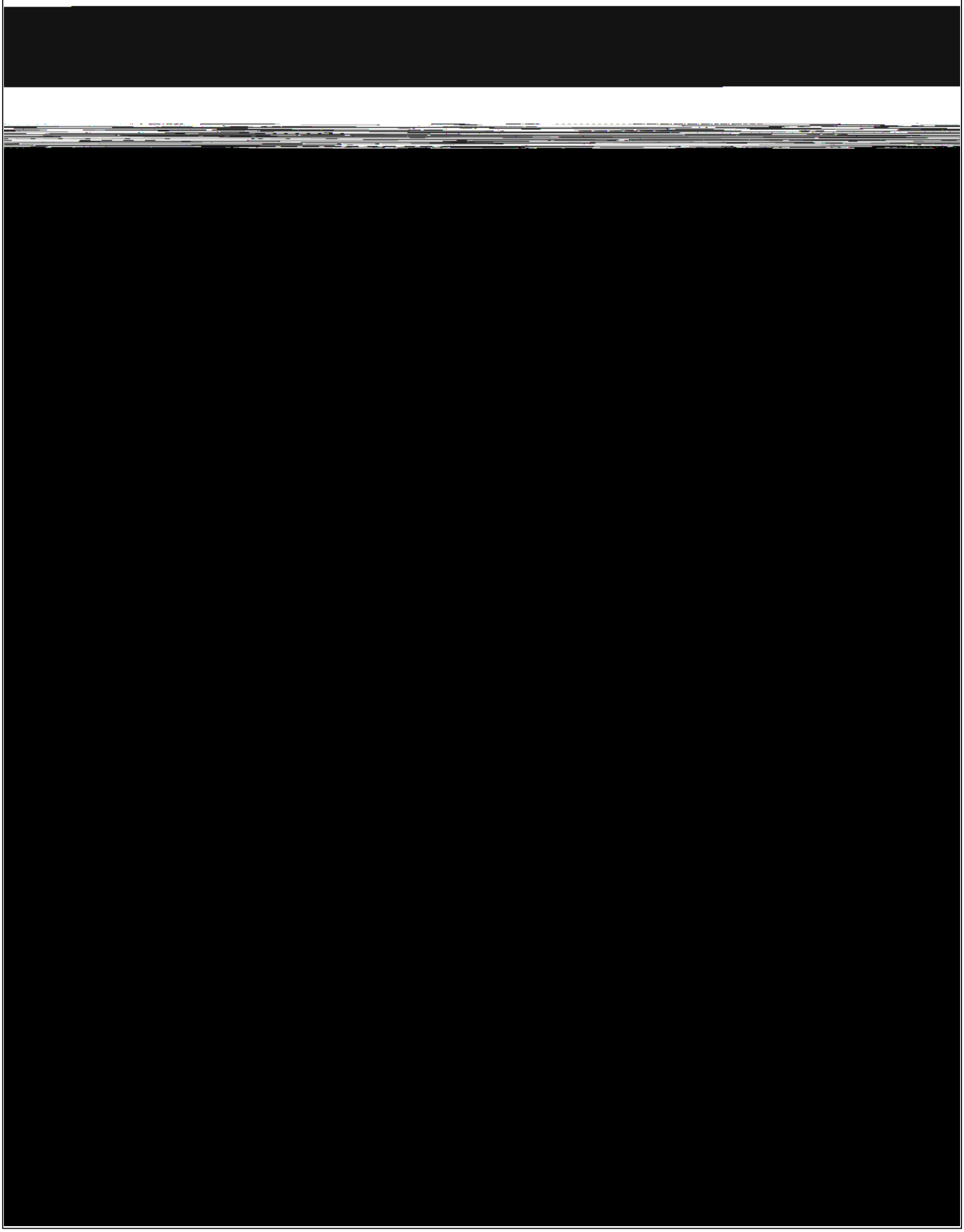

will not develop an outcome, in this case post-operative complications[25]. The accuracy with which a predictive model discriminated between outcomes was measured in terms of area under the receiver operating characteristics (ROC) curve or c-statistic. In the instance of the model having no discriminative ability, the c-statistic will be 0.5

Overall, the average score of methodological quality for the 20 studies comprised a

ing risk prediction models in this

ariate score and the RAI-Revised

index, all of which scored fourteen[29,67,68]. The best scor

group for methodological quality were the PNI multiv

every model in which these were reported (Figure 4). Meaningful subgroup analysis of

reached clinical utility on only one of the two occasions[35,51,54,55]. Furthermore, the revised STS model is yet to be externally validated. Calibration was not reported for the Takeuchi score or revised STS model but the NSQIP surgical risk calculator reported calibration once, and performed well[54]. A handful of other models displayed clinically useful discrimination in one of the two studies in which they were tested but failed to meet this threshold in the weighted mean. These included the Charlson comorbidity index, the age-adjusted Charlson comorbidity index and Rotterdam scores[30,46]. All

confidence. The models identified in our review as having clinical promise in predicting mortality and major complications were developed subsequent to these reviews. The reasons for vast majority of these models failing to sufficiently predict outcomes are multifactorial. Most clinical prediction tools are generated from outcome data from the same cohort on which the model is subsequently tested[23]. This predisposes the models to bias through overfitting to the development data set and thus subsequently poor performance when applied to an external population dataset[23]. In addition, several models were developed from a single centre with a relatively small dataset that further confounded their ability to predict uncommon clinical outcomes especially considering the relative rarity of mortality or major morbidity post-oesophagectomy. Larger development models are therefore required to reliably predict these events.

Aside from the studied multivariate risk models, there are a plethora of single factor prognostic indicators researched over this period. There have been three studies of the discriminatory capacity of cardiopulmonary fitness testing (CPEX), often represented through anaerobic threshold and VO_2 maximum[64]. In each study CPEX fell short of reaching clinical utility thresholds in predicting major complications following oesophagectomy[65,66]. Preoperative sarcopenia, represented through grip strength or volumetric psoas muscle analysis, has also been highlighted as a prognostic marker for perioperative and long-term outcomes following oesophagectomy. But again, the performance of sarcopenia in predicting outcomes following oesophagectomy has been highly variable[67]. A systematic review conducted in 2020 by Papaconstantinou *et al*[67] found a statistically significant relationship between preoperative sarcopenia and overall perioperative morbidity, respiratory complications and anastomotic leaks. However, the same study failed to demonstrate correlative significance for sarcopenia and perioperative mortality or major complications (Clavien-Dindo grade III or higher)[67].

There are a number of strengths to this review. The review was conducted thoroughly and reported in accordance with the PRISMA method, outlining the study search and selection strategy. There was no iterative manipulation of the search terms

ARTICLE HIGHLIGHTS

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