



Classification of pulmonary contusion on chest CT and its association with in-hospital outcomes: a systematic review

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Aims

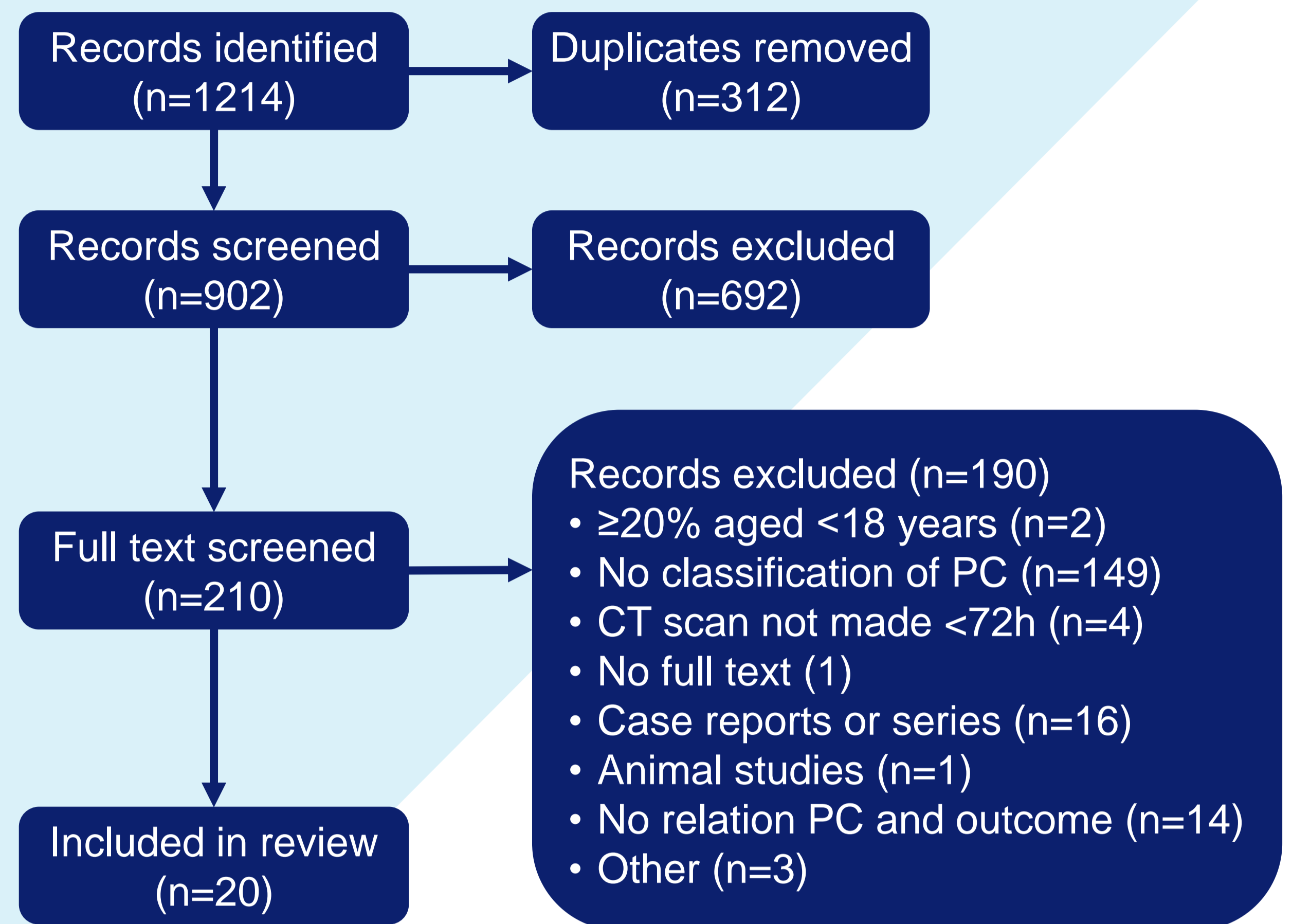
- 1) Identify existing classification methods for PC;
- 2) Determine the association between extent of PC measured per method and in-hospital outcomes.

Methods

Studies had to report a classification system for PC after blunt thoracic trauma based on a CT scan <72hr after trauma, in a population of at least 80% adults aged ≥18 years.

Results

Twenty studies were included. Pooled estimates showed no difference between patients with and without PC regarding concomitant injuries like flail chest or pneumothorax. The most used classification was calculating the % contused lung volume. Other methods were BPC-6, BPC-18 and AIS-chest. Contused volumes >18% to >24%, AIS-chest ≥3 and BPC ≥18 were associated with worse outcomes.



Conclusion

Calculating the % contused volume is the most used method to classify PC. This allows for the highest level of segmentation. Future research should standardize volumetric analysis and compare this to BPC and AIS-chest.

Table. Details on classification and risk factors for in-hospital outcomes and complications, N.D.; not described

Author (year)	Classification	HLOS	ICU-LOS	Pneumonia	ARDS
Bercher <i>et al.</i> (2012)	% lung volume	≥24% contusion	N.D.	≥24% contusion	≥24% contusion
Choi <i>et al.</i> (2022)	% lung volume	Positive association	N.D.	N.D.	N.D.
Christin <i>et al.</i> (2003)	% lung volume	N.D.	N.D.	N.D.	N.D.
Deunk <i>et al.</i> (2010)	% lung volume	≥18% contusion	≥18% contusion	≥18% contusion	≥18% contusion
Hamrick <i>et al.</i> (2009)	% lung volume	N.D.	N.D.	N.D.	N.D.
Lee <i>et al.</i> (2023)	% lung volume	N.D.	N.D.	>20% contusion	N.D.
Li <i>et al.</i> (2021)	% lung volume	Contusion present	Contusion present	N.D.	Contusion present
Mahmood <i>et al.</i> (2017)	% lung volume	N.D.	N.D.	N.D.	≥20% contusion
Miller <i>et al.</i> (2001)	% lung volume	N.D.	N.D.	≥20% contusion	≥20% contusion
Miller <i>et al.</i> (2019)	% lung volume	≥20% contusion	Any contusion	1-19% contusion	N.D.
Negrin <i>et al.</i> (2017)	% lung volume	N.D.	N.D.	N.D.	>8.1% contusion
Sarkar <i>et al.</i> (2023)	% lung volume	N.D.	N.D.	N.D.	Positive association
Wang <i>et al.</i> (2011)	% lung volume	N.D.	N.D.	N.D.	≥21.5% contusion
Wang <i>et al.</i> (2023)	% lung volume	N.D.	N.D.	≥22.0% contusion	N.D.
Sturmwasser <i>et al.</i> (2011)	CT Volume Index	>20% CTVI	>20% CTVI	>20% CTVI	N.D.
De Moya <i>et al.</i> (2011)	BPC6, BPC18	N.D.	N.D.	N.D.	N.D.
Zingg <i>et al.</i> (2021)	AIS, BPC18	Chest AIS / BPC18 ≥3	Chest AIS / BPC18 ≥3	N.D.	N.D.
Choi <i>et al.</i> (2021)	Presence of PC	Any Contusion present	N.D.	Bilateral contusion	N.D.
Mommsen <i>et al.</i> (2012)	AIS, BPC18, % lung volume, TTS	N.D.	≥19% contusion, BPC-18 ≥2, TTS ≥2	N.D.	≥19% contusion, BPC-18 ≥2, TTS >9
Pal <i>et al.</i> (2017)	Uninvolved volume	N.D.	N.D.	N.D.	N.D.

