Real-world Algorithm Development and Analysis for Recognition of Advanced Heart Failure (RADAR-HF): a multicenter, electronic health record study

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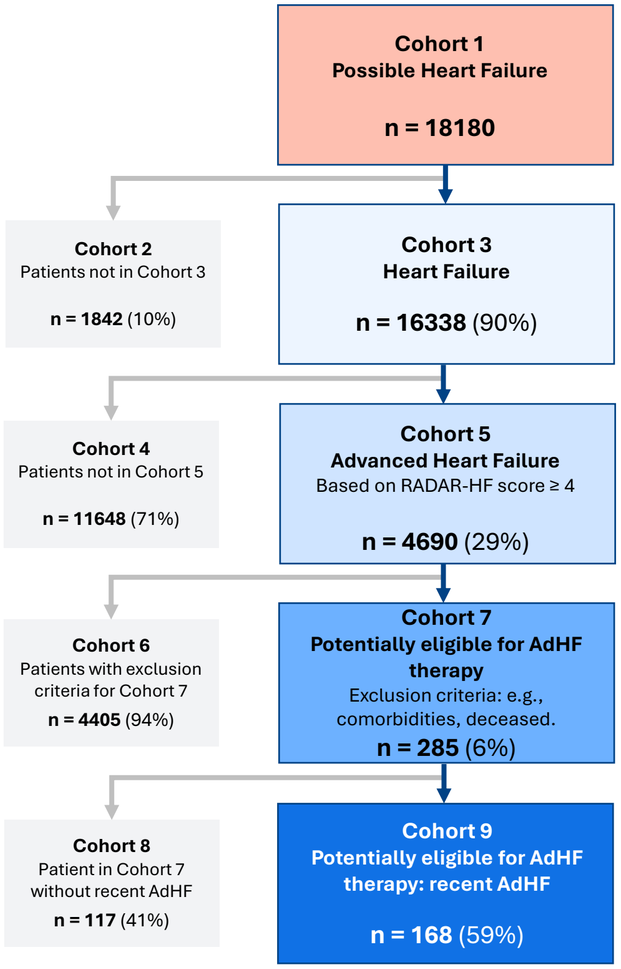


- An algorithm for **recognition of advanced heart failure** was developed based on 18,180 possible heart failure patients from 2 international hospitals, using:
  - Structured electronic health record data.
  - Natural language processing (NLP) pipeline for information extraction from unstructured data.

- **4690 patients with advanced heart failure** (AdHF) were identified by the algorithm, using the RADAR-HF scoring system:
- Advanced heart failure was correctly detected in 95% of patients with prior LVAD or HTx (n =21).
- Patients with AdHF (**Cohort 5**) compared to HF patients without AdHF (all p<0.0001):
  - Older
  - More comorbidities
  - More left sided valvular diseases
  - More device therapy
  - More ischemic cardiomyopathy
  - More loop diuretics, anticoagulants, amiodarone, digoxin and SGLT2i

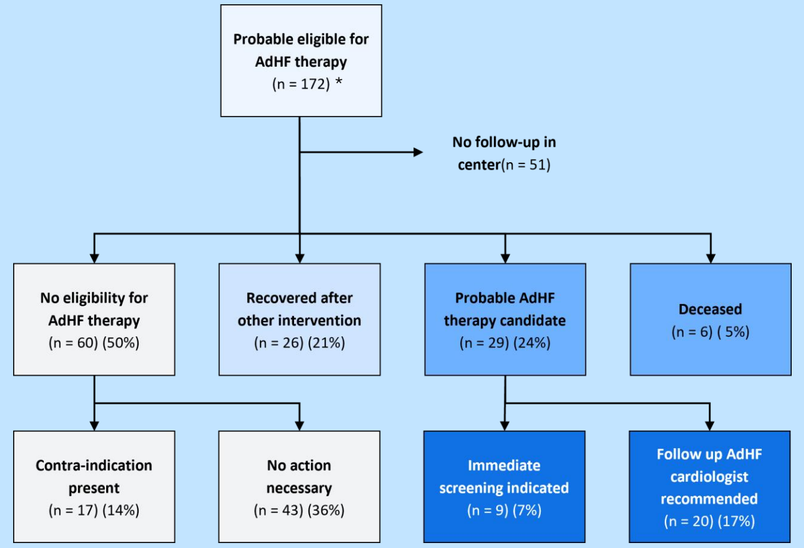
RADAR-HF scoring system.
A total score ≥4 was classified as AdHF

Criterion	Definition	Point
AdHF mention	NLP-detected "advanced HF" terms	4
Hospitalizations	≥2 with IV diuretics (w/in 1yr)	2
	1 with IV diuretics	1
IV inotropes	≥2 doses within 14 days	4
LVEF	≤15%	3
	15–20%	2
	20–30%	1
NT-proBNP	≥10,000 pg/mL	3
	3,000–9,999 pg/mL	2
	1,000–2,999 pg/mL	1
NYHA	Class IV	4
	Class III	3

- Common **exclusion criteria for AdHF therapy eligibility** were age >75 years (22%) and renal failure (18%).
- **Manual validation of the final cohort** was performed by advanced heart failure cardiologists.

Manual validation of AdHF therapy eligibility

Manual chart review of the final cohort by advanced heart failure cardiologists **confirmed potential advanced heart failure therapy eligibility in 24%** of the advanced heart failure therapy candidates selected by the algorithm.



* All of Cohort 9 (n=168) and patients in Cohort 6 with right- or biventricular heart failure as only exclusion criterion (n=4)

Conclusion

- The developed algorithm accurately identified AdHF in a real-world setting. AdHF was correctly detected in 95% of patients with prior LVAD or HTx.
- This system could serve as a clinically usable safety net, highlighting potentially AdHF therapy candidates.

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