

Supplementary Appendix S1

Complete Database Search Strategies

GLP-1–Based Incretin Agonists in Obesity-Related HFpEF: A Systematic Review and Meta-Analysis

1. Overview

This appendix provides the complete, reproducible search strategies applied in each database. All searches were conducted from database inception to October 31, 2025. Searches were restricted to human studies. No language restriction was applied. An RCT filter was applied as specified per database below.

Database	Interface / Platform	Date searched	Records retrieved (n)	RCT filter applied	Language restriction	Date range
PubMed/MEDLINE	NLM PubMed	31 Oct 2025	110	Cochrane HSSS (sensitivity-maximising)	None	Inception to 31 Oct 2025
Embase	Embase.com (Elsevier)	31 Oct 2025	145	Embase validated RCT filter	None	Inception to 31 Oct 2025
Cochrane CENTRAL	Cochrane Library	31 Oct 2025	28	Trials only (built-in filter)	None	Inception to 31 Oct 2025
Web of Science	Clarivate Web of Science Core Collection	31 Oct 2025	72	Document type: Article, Review	English	1990 to 31 Oct 2025
ClinicalTrials.gov	clinicaltrials.gov	31 Oct 2025	14	Interventional studies	None	Inception to 31 Oct 2025
Reference lists	Manual screening	Nov 2025	8	N/A	N/A	N/A
TOTAL			377			

After removal of 292 duplicates, 85 records were screened for title and abstract. HSSS = Highly Sensitive Search Strategy.

2. Full Search Strings by Database

2.1 PubMed/MEDLINE

Platform: National Library of Medicine PubMed (<https://pubmed.ncbi.nlm.nih.gov>). Date searched: 31 October 2025. RCT filter: Cochrane Highly Sensitive Search Strategy (sensitivity-maximising, revision 2008). No language restriction.

```
("Heart Failure"[MeSH Terms]
  OR "heart failure with preserved ejection fraction"[tiab]
  OR "HFpEF"[tiab]
  OR "diastolic heart failure"[tiab])
AND
("Obesity"[MeSH Terms]
  OR "obese"[tiab]
  OR "body mass index"[tiab]
  OR "BMI"[tiab]
  OR "overweight"[tiab])
AND
("Glucagon-Like Peptide 1"[MeSH Terms]
  OR "GLP-1 receptor agonist*"[tiab]
  OR "GLP1 receptor agonist*"[tiab]
  OR "semaglutide"[tiab]
  OR "liraglutide"[tiab]
  OR "tirzepatide"[tiab]
  OR "dulaglutide"[tiab]
  OR "exenatide"[tiab]
  OR "incretin*"[tiab]
  OR "GIP/GLP-1"[tiab])
AND
("Randomized Controlled Trial"[pt]
  OR "randomized"[tiab]
  OR "randomised"[tiab]
  OR "placebo"[tiab])
Filters: Humans; English; Publication date: 1990/01/01-2025/10/31
```

Retrieved: 110 records

2.2 Embase

Platform: Embase.com (Elsevier). Date searched: 31 October 2025. RCT filter: validated Embase RCT filter (Lefebvre et al., Cochrane Handbook). No language restriction.

```
('heart failure'/exp
  OR 'heart failure with preserved ejection fraction':ab,ti
  OR 'HFpEF':ab,ti
  OR 'diastolic heart failure':ab,ti)
AND
('obesity'/exp
```

```

OR 'obese':ab,ti
OR 'body mass index':ab,ti
OR 'BMI':ab,ti
OR 'overweight':ab,ti)
AND
('glucagon like peptide 1 receptor agonist'/exp
OR 'GLP-1 receptor agonist*':ab,ti
OR 'semaglutide':ab,ti
OR 'liraglutide':ab,ti
OR 'tirzepatide':ab,ti
OR 'dulaglutide':ab,ti
OR 'exenatide':ab,ti
OR 'incretin*':ab,ti
OR 'GIP/GLP-1':ab,ti)
AND
('randomized controlled trial'/exp
OR 'randomised':ab,ti
OR 'placebo':ab,ti
OR 'double blind':ab,ti)
Filters: Humans; Article types: randomized controlled trial, clinical trial;
Date: 1990-2025/10/31

```

Retrieved: 145 records

2.3 Cochrane Central Register of Controlled Trials (CENTRAL)

Platform: Cochrane Library (<https://www.cochranelibrary.com>). Issue 10, October 2025. Filter: Trials only (built-in). No language restriction.

```

#1 MeSH descriptor: [Heart Failure] explode all trees
#2 "heart failure with preserved ejection fraction" OR "HFpEF" OR
   "diastolic heart failure" (Title, Abstract, Keywords)
#3 #1 OR #2
#4 MeSH descriptor: [Obesity] explode all trees
#5 obese OR "body mass index" OR BMI OR overweight
   (Title, Abstract, Keywords)
#6 #4 OR #5
#7 MeSH descriptor: [Glucagon-Like Peptide-1 Receptor] explode all trees
#8 "GLP-1 receptor agonist*" OR semaglutide OR liraglutide OR
   tirzepatide OR dulaglutide OR exenatide OR incretin*
   (Title, Abstract, Keywords)
#9 #7 OR #8
#10 #3 AND #6 AND #9
Filter: Trials only; Date: to October 2025

```

Retrieved: 28 records

2.4 Web of Science

Platform: Clarivate Web of Science Core Collection (SCI-E, ESCI). Date searched: 31 October 2025. Document type: Article, Review. Language: English. Timespan: 1990–2025.

```
TS=("heart failure with preserved ejection fraction" OR "HFpEF"  
OR "diastolic heart failure")  
AND  
TS=(obese OR obesity OR "body mass index" OR BMI)  
AND  
TS=("GLP-1 receptor agonist*" OR semaglutide OR tirzepatide  
OR liraglutide OR dulaglutide OR exenatide OR incretin*)  
AND  
TS=(randomized OR randomised OR placebo OR "clinical trial")  
Filters: Document types: Article, Review; Languages: English;  
Timespan: 1990–2025
```

Retrieved: 72 records

2.5 ClinicalTrials.gov

Platform: <https://clinicaltrials.gov> (Advanced Search). Date searched: 31 October 2025. Study type: Interventional. No language or date restriction.

```
Condition: "Heart Failure with Preserved Ejection Fraction"  
Intervention: semaglutide OR tirzepatide OR liraglutide  
OR dulaglutide OR exenatide OR "GLP-1"  
Study type: Interventional (clinical trial)  
Date: through October 2025
```

Retrieved: 14 records (including completed and ongoing trials)

2.6 Reference List Screening

Reference lists of all 8 included publications and of 3 systematic reviews identified during screening were manually screened for additional eligible trials. This yielded 8 unique records not identified through database searching. All 8 were already captured by database searches and thus contributed 0 additional unique studies; they are counted in the identification total for transparency.

3. Key MeSH Terms and Synonyms Used

Concept	MeSH / Emtree descriptor	Free-text synonyms
Heart failure, preserved EF	"Heart Failure"[MeSH]; "Ventricular Dysfunction, Left"[MeSH]	HFpEF, diastolic heart failure, preserved ejection fraction
Obesity	"Obesity"[MeSH]; "Overweight"[MeSH]; "Body Mass	obese, BMI, overweight, adiposity, visceral fat

	Index"[MeSH]	
GLP-1 receptor agonists	"Glucagon-Like Peptide 1"[MeSH]; "Glucagon-Like Peptide-1 Receptor"[MeSH]	semaglutide, tirzepatide, liraglutide, dulaglutide, exenatide, albiglutide, incretin agonist, GIP/GLP-1
Study design	"Randomized Controlled Trial"[pt]; "Clinical Trial"[pt]	randomized, randomised, placebo-controlled, double-blind, RCT

Supplementary Appendix S1 — End of document