

SUPPLEMENTARY METHODS

Search strategy (August 31, 2023)

Search strategy for PubMed (1,512 items)

#1. "Diabetes Mellitus, Type 1"[Mesh]
 #2. (((((((((((((((((((((((((((((((Diabetes Mellitus, Insulin-Dependent[Title/Abstract]) OR (Diabetes Mellitus, Insulin Dependent[Title/Abstract])) OR (Insulin-Dependent Diabetes Mellitus[Title/Abstract])) OR (Diabetes Mellitus, Juvenile-Onset [Title/Abstract])) OR (Diabetes Mellitus, Juvenile Onset [Title/Abstract])) OR (Juvenile-Onset Diabetes Mellitus[Title/Abstract])) OR (IDDM[Title/Abstract])) OR (Juvenile-Onset Diabetes[Title/Abstract])) OR (Diabetes, Juvenile-Onset[Title/Abstract])) OR (Juvenile Onset Diabetes [Title/Abstract])) OR (Diabetes Mellitus, Sudden-Onset[Title/Abstract])) OR (Diabetes Mellitus, Sudden Onset[Title/Abstract])) OR (Sudden-Onset Diabetes Mellitus[Title/Abstract])) OR (Type 1 Diabetes Mellitus[Title/Abstract])) OR (Diabetes Mellitus, Insulin-Dependent, 1[Title/Abstract])) OR (Insulin-Dependent Diabetes Mellitus 1[Title/Abstract])) OR (Insulin Dependent Diabetes Mellitus 1[Title/Abstract])) OR (Type 1 Diabetes[Title/Abstract])) OR (Diabetes, Type 1[Title/Abstract])) OR (Diabetes Mellitus, Type I[Title/Abstract])) OR (Diabetes, Autoimmune [Title/Abstract])) OR (Autoimmune Diabetes[Title/Abstract])) OR (Diabetes Mellitus, Brittle[Title/Abstract])) OR (Brittle Diabetes Mellitus[Title/Abstract])) OR (Diabetes Mellitus, Ketosis-Prone[Title/Abstract])) OR (Diabetes Mellitus, Ketosis Prone[Title/Abstract])) OR (Ketosis-Prone Diabetes Mellitus [Title/Abstract])
 #3. #1 OR #2
 #4. "Insulin Infusion Systems"[Mesh]
 #5. (((((((((((((((((((((((((((((((Infusion System, Insulin[Title/Abstract]) OR (Infusion Systems, Insulin[Title/Abstract])) OR (Insulin Infusion System[Title/Abstract])) OR (System, Insulin Infusion[Title/Abstract])) OR (Systems, Insulin Infusion [Title/Abstract])) OR (Implantable Programmable Insulin Pump [Title/Abstract])) OR (Programmable Implantable Insulin Pump[Title/Abstract])) OR (Pump, Programmable Implantable Insulin[Title/Abstract])) OR (Insulin Pump, Programmable Implantable[Title/Abstract])) OR (Pancreas, Artificial Endocrine [Title/Abstract])) OR (Artificial Endocrine Pancreas[Title/Abstract])) OR (Endocrine Pancreas, Artificial [Title/Abstract])) OR (beta Cell, Artificial[Title/Abstract])) OR (Artificial beta Cell[Title/Abstract])) OR (Artificial beta Cells[Title/Abstract])) OR (Cell, Artificial beta[Title/Abstract])) OR

(Cells, Artificial beta[Title/Abstract])) OR (beta Cells, Artificial[Title/Abstract])) OR (bionic pancreas[Title/Abstract])) OR (synthetic pancreas[Title/Abstract])) OR (closed-loop[Title/Abstract])) OR (closed loop[Title/Abstract])) OR (Artificial pancreas[Title/Abstract])) OR (Pancreas, Artificial [Title/Abstract])) OR (automated insulin delivery[Title/Abstract])

#6. #4 OR #5

#7. (((((((((((((((((((((((((((((((randomized controlled trial[Publication Type])) OR (controlled clinical trial[Publication Type])) OR (randomized [Title/Abstract])) OR (placebo[Title/Abstract])) OR (randomly[Title/Abstract])) OR (controlled[Title/Abstract])) OR (trial[Title/Abstract])) OR (random[Title/Abstract])) OR (RCT[Title/Abstract])

#8. #3 AND #6 AND #7

Search strategy for Embase (1,335 items)

#1. ('diabetes'/exp OR diabetes) AND mellitus, AND type AND ('1'/exp OR 1)

#2. 'diabetes mellitus, insulin-dependent':ab,ti OR 'diabetes mellitus, insulin dependent':ab,ti OR 'insulin-dependent diabetes mellitus':ab,ti OR 'diabetes mellitus, juvenile-onset':ab,ti OR 'diabetes mellitus, juvenile onset':ab,ti OR 'juvenile-onset diabetes mellitus':ab,ti OR 'iddm':ab,ti OR 'juvenile-onset diabetes':ab,ti OR 'diabetes, juvenile-onset':ab,ti OR 'juvenile onset diabetes':ab,ti OR 'diabetes mellitus, sudden-onset':ab,ti OR 'diabetes mellitus, sudden onset':ab,ti OR 'sudden-onset diabetes mellitus':ab,ti OR 'type 1 diabetes mellitus':ab,ti OR 'diabetes mellitus, insulin-dependent, 1':ab,ti OR 'insulin-dependent diabetes mellitus 1':ab,ti OR 'type 1 diabetes':ab,ti OR 'diabetes, type 1':ab,ti OR 'diabetes mellitus, type i':ab,ti OR 'diabetes, autoimmune':ab,ti OR 'autoimmune diabetes':ab,ti OR 'diabetes mellitus, brittle':ab,ti OR 'brittle diabetes mellitus':ab,ti OR 'diabetes mellitus, ketosis-prone':ab,ti OR 'diabetes mellitus, ketosis prone':ab,ti OR 'ketosis-prone diabetes mellitus':ab,ti

#3. #1 OR #2

#4. insulin AND infusion AND systems

#5. 'infusion system, insulin':ab,ti OR 'infusion systems, insulin':ab,ti OR 'insulin infusion system':ab,ti OR 'system, insulin infusion':ab,ti OR 'systems, insulin infusion':ab,ti OR 'implantable programmable insulin pump':ab,ti OR 'programmable implantable insulin pump':ab,ti OR 'pump, programmable implantable insulin':ab,ti OR 'insulin pump, programmable implantable':ab,ti OR 'pancreas, artificial endocrine':ab,ti OR

'artificial endocrine pancreas':ab,ti OR 'endocrine pancreas, artificial':ab,ti OR 'beta cell, artificial':ab,ti OR 'artificial beta cell':ab,ti OR 'artificial beta cells':ab,ti OR 'cell, artificial beta':ab,ti OR 'cells, artificial beta':ab,ti OR 'beta cells, artificial':ab,ti OR 'bionic pancreas':ab,ti OR 'synthetic pancreas':ab,ti OR 'closed-loop':ab,ti OR 'closed loop':ab,ti OR 'artificial pancreas':ab,ti OR 'pancreas, artificial':ab,ti OR 'automated insulin delivery':ab,ti

#6. #4 OR #5

#7. 'randomized controlled trial':ab,ti OR 'controlled clinical trial':ab,ti OR 'randomized':ab,ti OR 'placebo':ab,ti OR 'randomly':ab,ti OR 'controlled':ab,ti OR 'trial':ab,ti OR 'random':ab,ti OR 'rct':ab,ti

#8. #3 AND #6 AND #7

Search strategy for Cochrane Library (1,750 items)

#1. Diabetes Mellitus, Type 1

#2. (Diabetes Mellitus, Insulin-Dependent):ab,ti,kw OR (Diabetes Mellitus, Insulin Dependent):ab,ti,kw OR (Insulin-Dependent Diabetes Mellitus):ab,ti,kw OR (Diabetes Mellitus, Juvenile-Onset):ab,ti,kw OR (Diabetes Mellitus, Juvenile Onset):ab,ti,kw OR (Juvenile-Onset Diabetes Mellitus):ab,ti,kw OR (IDDM):ab,ti,kw OR (Juvenile-Onset Diabetes):ab,ti,kw OR (Diabetes, Juvenile-Onset):ab,ti,kw OR (Juvenile Onset Diabetes):ab,ti,kw OR (Diabetes Mellitus, Sudden-Onset):ab,ti,kw OR (Diabetes Mellitus, Sudden Onset):ab,ti,kw OR (Sudden-Onset Diabetes Mellitus):ab,ti,kw OR (Type 1 Diabetes Mellitus):ab,ti,kw OR (Diabetes Mellitus, Insulin-Dependent, 1):ab,ti,kw OR (Insulin-Dependent Diabetes Mellitus 1):ab,ti,kw OR (Insulin Dependent Diabetes Mellitus 1):ab,ti,kw OR (Type 1 Diabetes):ab,ti,kw OR (Diabetes, Type 1):ab,ti,kw OR (Diabetes Mellitus, Type I):ab,ti,kw OR (Diabetes, Autoimmune):ab,ti,kw OR (Autoimmune Diabetes):ab,ti,kw OR (Diabetes Mellitus, Brittle):ab,ti,kw OR (Brittle Diabetes Mellitus):ab,ti,kw OR (Diabetes Mellitus, Ketosis-Prone):ab,ti,kw OR (Diabetes Mellitus, Ketosis Prone):ab,ti,kw OR (Ketosis-Prone Diabetes Mellitus):ab,ti,kw

#3. #1 or #2

#4. Insulin Infusion Systems

#5. (Infusion System, Insulin):ab,ti,kw OR (Infusion Systems, Insulin):ab,ti,kw OR (Insulin Infusion System):ab,ti,kw OR (System, Insulin Infusion):ab,ti,kw OR (Systems, Insulin Infusion):ab,ti,kw OR (Implantable Programmable Insulin Pump):ab,ti,kw OR (Programmable Implantable Insulin Pump):ab,ti,kw OR (Pump, Programmable Implantable Insulin):ab,ti,kw OR (Insulin Pump, Programmable Implantable):ab,ti,kw OR (Pan-

creas, Artificial Endocrine):ab,ti,kw OR (Artificial Endocrine Pancreas):ab,ti,kw OR (Endocrine Pancreas, Artificial):ab,ti,kw OR (beta Cell, Artificial):ab,ti,kw OR (Artificial beta Cell):ab,ti,kw OR (Artificial beta Cells):ab,ti,kw OR (Cell, Artificial beta):ab,ti,kw OR (Cells, Artificial beta):ab,ti,kw OR (beta Cells, Artificial):ab,ti,kw OR (bionic pancreas):ab,ti,kw OR (synthetic pancreas):ab,ti,kw OR (closed-loop):ab,ti,kw OR (closed loop):ab,ti,kw OR (Artificial pancreas):ab,ti,kw OR (Pancreas, Artificial):ab,ti,kw OR (automated insulin delivery):ab,ti,kw

#6. #4 or #5

#7. (randomized controlled trial):ab,ti,kw OR (controlled clinical trial):ab,ti,kw OR (randomized):ab,ti,kw OR (placebo):ab,ti,kw OR (randomly):ab,ti,kw OR (controlled):ab,ti,kw OR (trial):ab,ti,kw OR (random):ab,ti,kw OR (RCT):ab,ti,kw

#8. #3 and #6 and #7

Search strategy for Web of Science (9,795 items)

#1. TS=(Diabetes Mellitus, Type 1 OR Diabetes Mellitus, Insulin-Dependent OR Diabetes Mellitus, Insulin Dependent OR Insulin-Dependent Diabetes Mellitus OR Diabetes Mellitus, Juvenile-Onset OR Diabetes Mellitus, Juvenile Onset OR Juvenile-Onset Diabetes Mellitus OR IDDM OR Juvenile-Onset Diabetes OR Diabetes, Juvenile-Onset OR Juvenile Onset Diabetes OR Diabetes Mellitus, Sudden-Onset OR Diabetes Mellitus, Sudden Onset OR Sudden-Onset Diabetes Mellitus OR Type 1 Diabetes Mellitus OR Diabetes Mellitus, Insulin-Dependent, 1 OR Insulin-Dependent Diabetes Mellitus 1 OR Insulin Dependent Diabetes Mellitus 1 OR Type 1 Diabetes OR Diabetes, Type 1 OR Diabetes Mellitus, Type I OR Diabetes, Autoimmune OR Autoimmune Diabetes OR Diabetes Mellitus, Brittle OR Brittle Diabetes Mellitus OR Diabetes Mellitus, Ketosis-Prone OR Diabetes Mellitus, Ketosis Prone OR Ketosis-Prone Diabetes Mellitus) and Preprint Citation Index (Exclude - Database)

#2. TS=(Insulin Infusion Systems OR Infusion System, Insulin OR Infusion Systems, Insulin OR Insulin Infusion System OR System, Insulin Infusion OR Systems, Insulin Infusion OR Implantable Programmable Insulin Pump OR Programmable Implantable Insulin Pump OR Pump, Programmable Implantable Insulin OR Insulin Pump, Programmable Implantable OR Pancreas, Artificial Endocrine OR Artificial Endocrine Pancreas OR Endocrine Pancreas, Artificial OR beta Cell, Artificial OR Artificial beta Cell OR Artificial beta Cells OR Cell, Artificial beta OR Cells, Artificial beta OR beta Cells,

Artificial OR bionic pancreas OR synthetic pancreas OR closed-loop OR closed loop OR Artificial pancreas OR Pancreas, Artificial OR automated insulin delivery) and Preprint Citation Index (Exclude – Database)

#3. TS=(randomized controlled trial OR controlled clinical trial OR randomized OR placebo OR randomly OR controlled OR trial OR random OR RCT) and Preprint Citation Index (Exclude – Database)

#4. (#1 AND #2 AND #3)

Search strategy for ClinicalTrial.gov (79 items)

Closed loop AND Type 1 Diabetes

Data extraction form

For every trial we extracted following information.

Trial characteristics

1. Identifier (author years)
2. NCT
3. Design of the trial
4. Setting
5. Population

Intervention characteristics

1. Automated insulin delivery systems
2. Continuous glucose monitoring
3. Insulin pump
4. Algorithm
5. Type of closed-loop system
6. Hormone
7. Comparator
8. Time of intervention
9. Length of follow-up

10. Remote monitoring

Baseline characteristics

1. Patients (*n*)
2. Age (mean ± SD)
3. Male (*n*)
4. Weight (mean ± SD)
5. BMI (mean ± SD)
6. Diabetes duration (mean ± SD)
7. Pump duration (mean ± SD)
8. HbA1c (mean ± SD)
9. Insulin dose (mean ± SD)

Outcomes

1. Percentage of time in range (TIR) (mean ± SD)
2. Percentage of time below range (TBR) (mean ± SD)
3. Percentage of time above range (TAR) (mean ± SD)
4. Coefficient of variation (CV) (mean ± SD)
5. Glycaemia risk index (mean ± SD)
6. HbA1c (mean ± SD)
7. Insulin dose (mean ± SD)
8. Patients with severe hypoglycemia (*n*)
9. Patients with diabetic ketoacidosis (*n*)

Information for assessment of risk bias

1. Sequence generation (or randomized treatment order for cross-over studies)
2. Allocation concealment
3. Blinding
4. Incomplete outcome data
5. Selective outcome reporting
6. Other bias