

# Heart surgery of severe rheumatic heart disease – a rapid review

## Plain language summary

Heart surgery such as valve repair or valve replacement may at some point become necessary for people with severe rheumatic heart disease. Recommendations and guidelines conclude that when possible the valve repair is preferred over replacement for people with severe rheumatic heart disease.

We did not find any systematic reviews of randomised trials that address this question. However, there are some systematic reviews of observational studies. These were listed and not judged for quality or certainty. We conclude that research is lacking about the comparative effectiveness and safety of heart surgeries for people with severe rheumatic heart disease.

## Commission

The Norwegian Institute of Public Health, ([NIPH](#)) was commissioned by the Bergen Centre for Ethics and Priority Setting ([BCEPS](#)), University of Bergen to systematically search for and summaries evidence on the effect of heart surgery (valve repair or replacement) for people with severe rheumatic heart disease.

## Background

Rheumatic heart disease is the most commonly acquired heart disease in children and young people. One or several episodes of rheumatic fever, an autoimmune inflammatory reaction to throat infection with group A streptococci (streptococcal pharyngitis or strep throat) can cause damage to the heart and give rheumatic heart disease. Most often the heart valves are affected. It can lead to death or life-long disability. There is no cure for rheumatic heart disease and the damage to the heart valves are permanent. Patients with severe rheumatic heart disease will often require surgery to replace or repair the damaged valve or valves ([WHO](#) (accessed January 2021)).

The clinical support tool from [BMJ Best Practice](#) provides a [complete clinical decision tool about rheumatic fever](#) and a list of [existing clinical guidelines](#) (both international, regional and national). Among the listed guidelines, the following cover the whole disease with primary and secondary prevention as well as management and surgery of rheumatic heart disease:

- [Australian Guidelines](#)
- [Fiji Guidelines](#)
- [New Zealand Guidelines](#)
- [Indian Guidelines](#)
- [WHO Technical Report](#)

BMJ Best Practice also has one section about [rheumatic heart disease](#) and treatment options at this stage that states that (accessed January 2021):

*“Around 30% to 50% of all patients with rheumatic fever will develop rheumatic heart disease, and this risk increases to more than 70% if the initial attack is severe or if there has been at least one recurrence. Typically this affects the mitral valve, but mixed aortic and mitral disease can occur. This may be detected through routine follow-up or if the*

*patient develops symptoms of breathlessness or decreased exercise tolerance. The extent of valve damage can be monitored by echocardiography, and valve repair or replacement surgery may be required. Mitral valve repair is preferred to replacement as patients are young and a replacement tissue valve is only likely to last up to 15 years. The alternative is a mechanical valve requiring lifelong anticoagulation. Additional complications include atrial fibrillation and congestive heart failure.”*

In addition [The American Heart Association](#) has made the following statement:

*“Global survival and survival free from prosthetic valve complications are lower after valve replacement with either mechanical or biological prostheses, because of higher rates of thromboembolism in the former and a faster degenerative process in the latter. The lower incidence of these complications with aortic prostheses and the greater difficulty with aortic valve repair makes aortic valve replacement more acceptable... Additionally, in RHD-endemic regions with emerging surgery programs, the most important considerations may be the risk of needing reoperation given limited resources (and low probability of being able to get a second operation) and the surgical team having more expertise in valve replacement than repair. As a result, valve replacement is often the practice of choice in many settings, especially for double-valve surgery, despite the need for lifetime anticoagulation”.*

The Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology and the European Association for Cardio-Thoracic Surgery has written the following in their [Guidelines](#):

*“Despite the absence of a randomized comparison between the results of valve replacement and repair, it is widely accepted that, when feasible, valve repair is the optimal surgical treatment in patients with severe MR. When compared with valve replacement, repair has a lower perioperative mortality, improved survival, better preservation of postoperative LV function, and lower long-term morbidity...”*

## PICO

**Population:** People with rheumatic heart disease

**Intervention:** Heart surgery (valve replacement or repair)

**Comparison:** No surgery, medication or comparison of different types of heart surgeries

**Outcomes:** Mortality, morbidity, disability/ quality of life, adverse events

**Setting:** All countries and settings

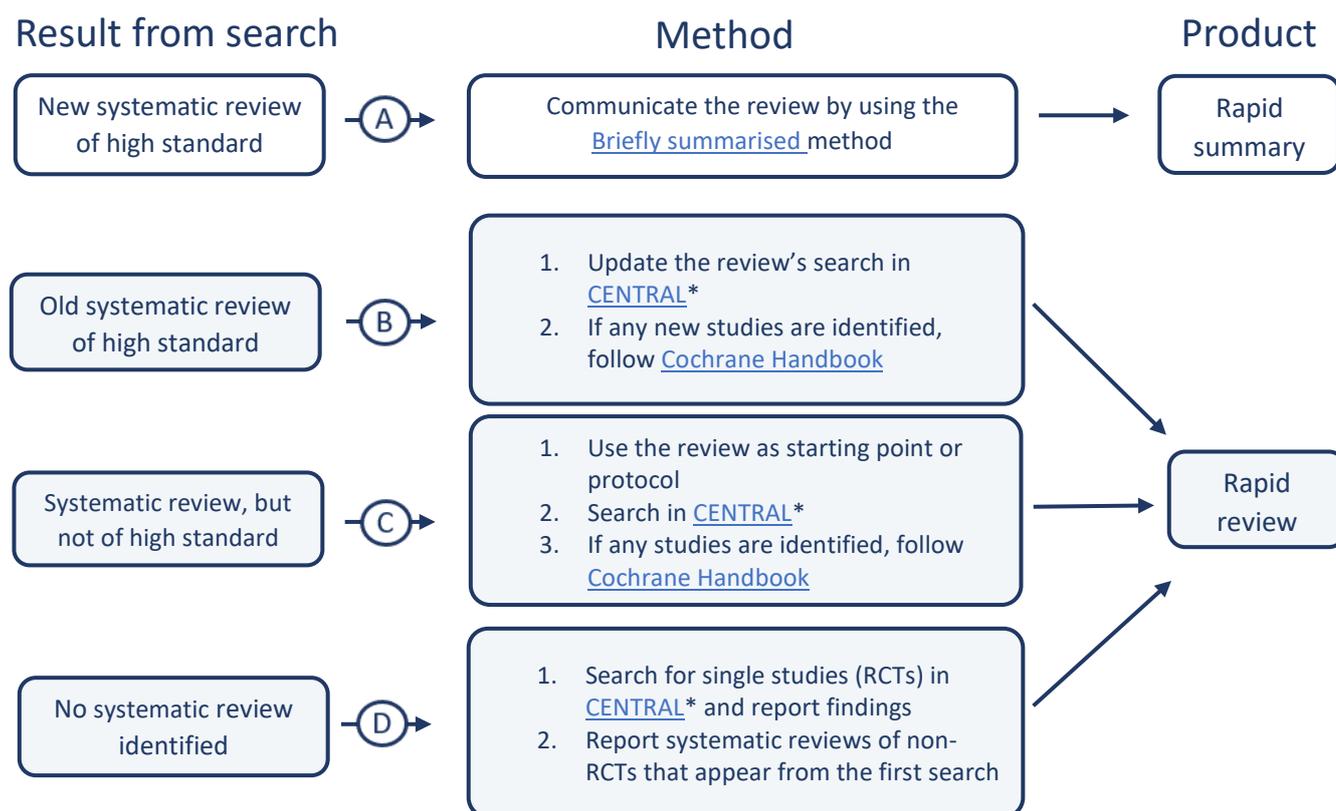
**Study design:** Systematic review of randomised controlled trials

## Description of the general methodological approach

For questions about effectiveness of interventions, a natural starting point is to try to find systematic reviews. To find systematic reviews, we here search in [Epistemonikos](#).

As illustrated in figure 1, the method used and product produced will depend on what type of results we have from the search in [Epistemonikos](#). If we identify a relatively new and high standard systematic review, we will make a communication product called a rapid summary. We will follow method A and produce the rapid summary according to Cochrane Norway’s [Briefly summarised](#) method. If we find a systematic review that for some reason cannot be communicated in its present form as a rapid summary, we will make a rapid review. We will use either method B or C, depending on the type of challenge we find with the review in its present form. If we cannot find any systematic reviews in [Epistemonikos](#), we will write a rapid review where we seek to find single studies that are randomised controlled trials (RCTs). Also, other systematic reviews of non-RCT will be reported from the initial search for systematic reviews. Systematic reviews of randomised controlled studies that evaluate effectiveness of interventions are relevant and we will not search for systematic reviews of observational studies.

Figure 1. Illustration of the general methodological approach



\* We will perform searches for randomised controlled studies in CENTRAL only, even in updates of existing systematic reviews that have searched other places in their original search. All steps in a systematic review approach, selecting studies, assessing risk of bias, making analyses and judging the certainty of the evidence, is according to [Cochrane Handbook for Systematic Reviews of Interventions 2020](#).

### Description of this note's method

We searched [Epistemonikos](#) for systematic reviews in January 2021. We used the following search strategy:

```
(title:(rheumatic) OR abstract:(rheumatic)) AND (title:((heart) OR (cardiac) OR (valve)) OR abstract:((heart) OR (cardiac) OR (valve))) AND (title:((surg*) OR (replace*) OR (repair*)) OR abstract:((surg*) OR (replace*) OR (repair*)))
Filters: systematic review
```

One person performed the search and selected relevant systematic reviews and the other double checked.

### Results

We found 20 systematic reviews, of which one, [Singh 2020](#), includes randomised controlled trials (RCTs). This systematic review does, however, not answer our PICO question directly. We have therefore listed this systematic review in a table of excluded systematic reviews. We did not do any further assessments of this systematic review.

Next, we searched for primary studies. We could not find any randomised controlled trials or controlled trials in our search in CENTRAL either (see search strategy below).

#1	MeSH descriptor: [Rheumatic Heart Disease] explode all trees	139
#2	"Rheumatic heart"	328
#3	valve	8541
#4	#1 OR #2	328
#5	#4 AND #3	185

We could not find any studies directly comparing one type of heart surgery or procedure with another comparison (another type of heart surgery or procedure, medical intervention or no treatment, standard treatment etc.). When we lack direct comparisons in studies, we are not able to generalise about the effectiveness of an intervention and conclude about causality. However, as we identified systematic reviews summarising observational studies that were relevant for our question, we chose to list these in a table of excluded systematic reviews that appeared in the initial search in Epistemonikos.

In the table 1 we have listed the systematic reviews we excluded after reading them in full text. We have not assessed the quality of the systematic reviews ([Fu 2017](#); [Mihos 2016](#); [Saurav 2015](#); [Shuhaiber 2007](#); [Wang 2013](#)) nor the certainty of the results they presented. The conclusions should be interpreted with caution. In general, results from observational studies start off at low certainty. In the table we have listed the reference of the systematic review to the left. Additionally, we present the number of included studies and their methodological design. When possible, we also listed the number of patients and their diagnosis. Intervention is listed as well as the comparator if there was any. The main conclusion is presented very briefly in the right column.

Table 1. Information about the excluded systematic reviews

Systematic review	N Study design	N Population	Intervention ----- Comparison	Authors' main conclusion
<a href="#">Fu 2017</a>	10 Observational studies	2770 People with rheumatic heart disease in need of mitral valve repair	Mitral valve repair ----- No comparison group	MV repair: <ul style="list-style-type: none"> <li>• low early mortality</li> <li>• high long-term survival</li> <li>• freedom from valve-related complications</li> <li>• reoperation rate is acceptable</li> </ul>
<a href="#">Mihos 2016</a>	5 Observational studies	196 People with rheumatic mitral regurgitation	Mitral valve repair using glutaraldehyde-treated autologous pericardial leaflet augmentation ----- No comparison group	MV repair: <ul style="list-style-type: none"> <li>• safely performed</li> <li>• excellent survival</li> <li>• low rate of reoperation at follow-up</li> </ul>
<a href="#">Saurav 2015</a>	8 Observational studies	3924 People with mitral valve disease including patients with history of rheumatic heart disease	Mitral valve repair ----- Mitral valve replacement	MV replacement is preferable to repair
<a href="#">Singh 2020</a>	7 Randomised controlled trials	553 Patients with severe mitral stenosis	Percutaneous transvenous mitral commissurotomy (PTMC) ----- Surgical commissurotomy (SC)	We recommend PTMC to young patients with MS and favourable valve morphology
<a href="#">Shuhaiber 2007</a>	29 Observational studies	<b>N was not reported</b> People with mitral valve disease, either ischemic, degenerative/ myxomatous; rheumatic or mixed	Mitral valve repair ----- Mitral valve replacement	MV repair: <ul style="list-style-type: none"> <li>• lower early mortality</li> </ul> Exception of patients with active rheumatic mitral valve disease
<a href="#">Wang 2013</a>	7 Observational studies	3227 Adult patients with rheumatic heart disease	Mitral valve repair ----- Mitral valve replacement	MV repair: <ul style="list-style-type: none"> <li>• better event-free survival</li> <li>• acceptable reoperation rate</li> <li>• avoiding lifelong anticoagulation</li> </ul>

## References to excluded systematic reviews

### [Fu 2017](#)

Fu J-T, Popal MS, Zhang H-B, Han W, Hu Q-M, Meng X, Ma C-Y. A meta-analysis of late outcomes of mitral valve repair in patients with rheumatic heart disease. *J Thorac Dis* 2017;9(11):4366-4375

### [Mihos 2016](#)

Mihos CG, Pineda AM, Capoulade R, Santana O. A Systematic Review of Mitral Valve Repair With Autologous Pericardial Leaflet Augmentation for Rheumatic Mitral Regurgitation. *Ann Thorac Surg*. 2016 Oct;102(4):1400-5. doi: 10.1016/j.athoracsur.2016.04.009. Epub 2016 Jun 17. PMID: 27319989.

### [Saurav 2015](#)

Saurav A, Alla VM, Kaushik M, Hunter CC, Mooss AV. Outcomes of mitral valve repair compared with replacement in patients undergoing concomitant aortic valve surgery: a meta-analysis of observational studies. *Eur J Cardiothorac Surg*. 2015 Sep;48(3):347-53. doi: 10.1093/ejcts/ezu421. Epub 2014 Nov 5. PMID: 25378363.

### [Singh 2020](#)

Singh AD, Mian A, Devasenapathy N, et al. Percutaneous mitral commissurotomy versus surgical commissurotomy for rheumatic mitral stenosis: a systematic review and meta-analysis of randomised controlled trials. *Heart* 2020;106:1094-1101.

### [Shuhaiber 2007](#)

Shuhaiber J, Anderson RJ. Meta-analysis of clinical outcomes following surgical mitral valve repair or replacement. 2007. In: Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews [Internet]. York (UK): Centre for Reviews and Dissemination (UK)

### [Wang 2013](#)

Wang Z, Zhou C, Gu H, Zheng Z, Hu S. Mitral valve repair versus replacement in patients with rheumatic heart disease. *J Heart Valve Dis*. 2013 May;22(3):333-9. PMID: 24151759.

## Suggested citation

Fønhus MS and Dalsbø TK. Heart surgery of severe rheumatic heart disease - a rapid review. 2021. Norwegian Institute of Public Health (NIPH).