

**Article Information:** <https://dx.doi.org/10.21037/cdt-21-577>

**Reviewer A:**

The authors should be commended on a very interesting analysis of outcomes of surgical repair of post-infarct ventricular septal rupture (VSR), comparing anterior to posterior VSR. Please see the following suggestions:

1. This is a single center study, and this should be clearly stated in the methods section.

**Reply:**we have modified our text as advised (see Page 2, line 26).

**Changes in the text:**We added this sentence to the methods section: This was a single center, retrospective, observational study.

2. The authors rightly comment that the similarity in outcomes between anterior and posterior VSR may be attributed to differences in rates of operative management between these two entities (e.g. perhaps surgeons take a more aggressive approach towards anterior VSR, because of the perception that posterior VSR is higher risk). Can the authors provide data on the overall number of VSRs in their center and what proportion are managed operatively?

**Reply:**we have modified our text as advised (see Page 11, lines 210 to 223).

**Changes in the text:**We added this paragraph to the discussion section:

VSR carries a high rate of fatality, and the effects of conservative treatment with drugs are not good. Without active surgical treatment, it has been reported that 24% of patients died within one week of VSR, and 80% of patients died within one month (17). A total of 139 patients with VSR were admitted to our center from January 2009 to January 2020, of which 51.1% (71/139) did not undergo surgery. In these patients, anterior VSR accounted for 64.8% (46/71) and posterior VSR accounted for 35.2% (25/71). In addition, 42.3% (30/71) died within one week of VSR, 60.6% (43/71) died within two weeks, 77.5% (55/71) died within one month, and only 7.0% (5/71) were alive during the follow-up period. These results are similar to those reported in previous studies (17,18). The reasons for these patients not receiving surgical treatment are as follows: first, some patients died before surgery in the acute VSR phase; second, some patients may have had complications other than heart disease, increasing the risk of surgery; third, some patients and their families refused surgical treatment because of cost or other reasons.

17.Asai T. Postinfarction ventricular septal rupture: can we improve clinical outcome of surgical repair?[J]. Gen Thorac Cardiovasc Surg, 2016, 64(3):121-30.

18.Moreyra AE, Huang MS, Wilson AC, et al. Trends in incidence and mortality rates of ventricular septal rupture during acute myocardial infarction. Am J Cardiol 2010;106:1095-100.

3. Very few of these patients were operated on in the acute phase (13.2% <7 days). How many VSRs presented in total and how many died before surgery?

**Reply:**we have modified our text as advised (see Page 11 , lines 210 to 218).

**Changes in the text:**We added this paragraph to the discussion section:

VSR carries a high rate of fatality, and the effects of conservative treatment with drugs are not good. Without active surgical treatment, it has been reported that 24% of patients died within one week of VSR, and 80% of patients died within one month (17). A total of 139 patients with VSR were admitted to our center from January 2009 to January 2020, of which 51.1% (71/139) did not undergo surgery. In these

patients, anterior VSR accounted for 64.8% (46/71) and posterior VSR accounted for 35.2% (25/71). In addition, 42.3% (30/71) died within one week of VSR, 60.6% (43/71) died within two weeks, 77.5% (55/71) died within one month, and only 7.0% (5/71) were alive during the follow-up period.

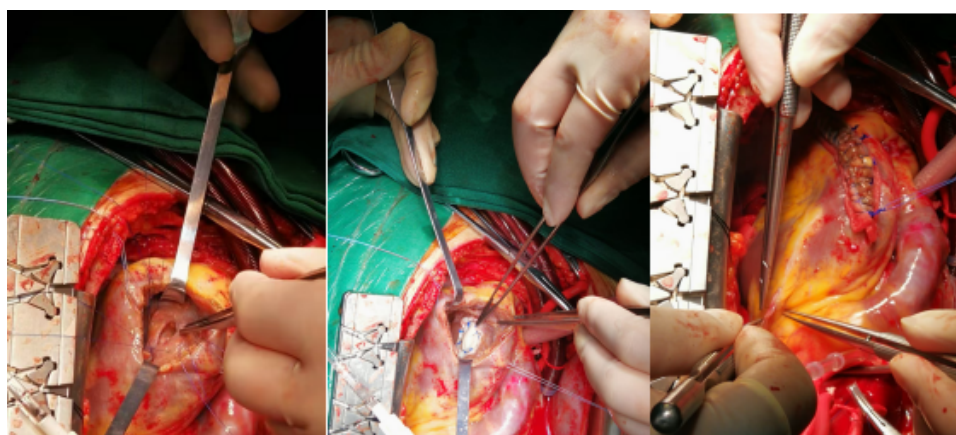
17.Asai T. Postinfarction ventricular septal rupture: can we improve clinical outcome of surgical repair?[J]. Gen Thorac Cardiovasc Surg, 2016, 64(3):121-30.

4. It would be informative to include operative illustrations or photos to demonstrate the surgical techniques you describe. This is not essential.

**Reply:**

Because this study was a single-center, retrospective, observational study, the collection of many photos of heart incision in the past is insufficient, and some photos collected during the operation may not meet the requirements of publication. At the same time, the incidence of posterior ventricular septal rupture in this study is lower than that of anterior ventricular septal rupture, and the heart must be elevated in order to be fully exposed during the repair of posterior ventricular septal rupture, which increases the difficulty of shooting. Therefore, in the follow-up study, we will pay attention to collecting the surgical photos of these patients.

The following three pictures are the previous pictures of repair of anterior ventricular septal rupture.



5. The paper would benefit from grammatical editing, as there are many grammatical errors.

**Reply:** We have finished the grammar editing.

**Reviewer B:**

The authors investigated their surgical outcome of the ventricular septal defect (VSR) after myocardial infarction. The major finding of the study is that the outcome of posterior VSR is not worsen than that of anterior VSR, which is different from a recent systematic review and meta-analysis (reference 6). The authors also found that the cases underwent concomitant coronary artery bypass graft had better outcome, which is also different from the outcome of reference 6. In general, this is a well-written paper, and the data are clearly presented. These findings will be of interest to cardiologists and cardiovascular surgeons.

I have a few concerns.

Major comment:

Line 93: Theoretically, right ventricular approach is one of good option for posterior VSR (PMID: 34023237). Do the authors have the experiments of the right ventricular approach and/or have some comments? If the authors added the advantage and points be improved of their surgical technique, it will

be helpful for readers.

**Reply:** we have modified our text as advised (see Page 5 and 6, lines 100 to 121).

**Changes in the text:** We added some details to the surgical technique section:

The septal rupture repair is usually exposed through an incision in the infarcted left ventricular myocardium or ventricular aneurysm but may also be accessed through an incision in the right ventricle or atrium (9,10). In this study, the location of the anterior VSR incision was parallel to the anterior descending branch 1-2 cm in the position of the ventricular aneurysm, and the large diagonal branch was carefully protected. The posterior VSR requires the heart to be elevated to be fully exposed. The incision was made at 1-2 cm parallel to the posterior descending branch in the left ventricle infarction site. The posterior descending branch is close to the posteromedial papillary muscle, and the submitral device needs to be protected. The selection of such incision allows the most direct visualization of the VSR, and it is easier to perform the resection of the ventricular aneurysm.

Some patients received direct VSR patch repair (Dagget) (11) due to evident fibrosis of the rupture site. The majority of VSR patients, however, were subjected to the classical infarct exclusion technique (David) (12) or the modified David procedure (13,14). Bovine pericardium mesh of appropriate size was selected to better preserve the left ventricular geometry. The pericardium was sutured to the lower part of the non-infarcted myocardium in the ventricular septum and the non-infarcted myocardium in the anterior wall of the left ventricle to isolate the left ventricle from the infarcted myocardium, and the fragile tissue was continuously reinforced and sutured. Finally, two pieces of Teflon felt were used to close the left ventricular incision. Modified infarct exclusion technology allows better preservation of the left ventricular geometry and effectively reduces the rate of postoperative residual shunt recurrence.

9. Kinoshita T, Asai T, Hachiro K, et al. Extended sandwich patch technique via right ventriculotomy for acute ventricular septal rupture. *Ann Thorac Surg*. 2021;S0003-4975(21)00883-3.
10. Massetti M, Babatasi G, Le Page O, et al. Postinfarction ventricular septal rupture: early repair through the right atrial approach. *J Thorac Cardiovasc Surg* 2000;119:784-9.
11. Daggett WM, Guyton RA, Mundth ED, Buckley MJ, McEnany MT, Gold HK, et al. Surgery for post-myocardial infarct ventricular septal defect. *Ann Surg* 1977;186:260-71.
12. David TE, Dale L, Sun Z. Postinfarction ventricular septal rupture: repair by endocardial patch with infarct exclusion. *J Thoracic Cardiovasc Surg* 1995;110:1315-22.
13. Parachuri VR, Tripathy AK, Gaikwad NM, et al. Modified infarct exclusion technique for repair of postinfarction ventricular septal rupture. *Ann Thorac Surg* 2019;107:219-21.
14. Komeda M. The Alternative method of patch implantation and creation for postinfarction ventricular septal defect repair by the infarct exclusion technique. *J Thorac Cardiovasc Surg* 2017;153:91-3.

Minor comments:

Line 67: (1) and (7) are confusing, Is (1) a criteria number and is (7) a reference number? The authors should change the form.

**Reply:** The modification has been completed.

Line 93-: If the schema showing the approach method (ventriculotomy) of anterior and posterior VSR are added, it will help for readers' understanding.

**Reply:**

Because this study was a single-center, retrospective, observational study, the collection of many photos of heart incision in the past is insufficient, and some photos collected during the operation may not meet the requirements of publication. At the same time, the incidence of posterior ventricular septal rupture in this study is lower than that of anterior ventricular septal rupture, and the heart must be elevated

in order to be fully exposed during the repair of posterior ventricular septal rupture, which increases the difficulty of shooting. Therefore, in the follow-up study, we will pay attention to collecting the surgical photos of these patients.