International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Operating Publisher
SciFormat Publishing Inc.
ISNI: 0000 0005 1449 8214

2734 17 Avenue SW,
Calgary, Alberta, T3E0A7,
Canada
+15878858911
editorial-office@sciformat.ca

ARTICLE TITLE	BENTALL PROCEDURE IN THE TREATMENT OF AORTIC DISSECTION (AD) – CURRENT STATE OF KNOWLEDGE AND LITERATURE REVIEW
DOI	https://doi.org/10.31435/ijitss.2(50).2026.5662
RECEIVED	19 March 2026
ACCEPTED	22 June 2026
PUBLISHED	30 June 2026
LICENSE	The article is licensed under a **Creative Commons Attribution 4.0 International License.**

BENTALL PROCEDURE IN THE TREATMENT OF AORTIC DISSECTION (AD) – CURRENT STATE OF KNOWLEDGE AND LITERATURE REVIEW

Tomasz Furgoł *(Corresponding Author, Email: tomekfurgo@gmail.com)*
Medical University of Silesia, Zabrze, Poland
ORCID ID: 0009-0007-4468-0895

Konrad Gigoń
Medical University of Silesia, Zabrze, Poland
ORCID ID: 0009-0006-4593-4677

Joanna Jureczko
Academy of Silesia, Katowice, Poland
ORCID ID: 0009-0002-6006-5917

Robert Kasza
Medical University of Silesia, Zabrze, Poland
ORCID ID: 0009-0003-5357-5983

Maksymilian Ratajczak
Medical University of Silesia, Zabrze, Poland
ORCID ID: 0009-0007-9530-1891

Maciej Smreczak
Medical University of Silesia, Zabrze, Poland
ORCID ID: 0009-0006-9407-9478

Marcin Jezierzański
Medical University of Silesia, Zabrze, Poland
ORCID ID: 0009-0000-9941-5318

Michał Miciak
Wroclaw Medical University, Wroclaw, Poland
ORCID ID: 0000-0001-6130-2270

Dominika Mularska
Medical University of Silesia, Katowice, Poland
ORCID ID: 0009-0007-4347-1469

ABSTRACT

Background: Aortic dissection (AD) is a rare but life-threatening condition caused by damage to the aortic wall, leading to abnormal blood flow and severe complications such as tissue perfusion disorders, potential rupture, and fatal hemorrhage. Diagnosis is primarily based on imaging studies, and in cases of acute type A aortic dissection (TAAD), urgent cardiac surgical intervention is required. Treatment generally involves replacing the affected segment of the aorta, sometimes in conjunction with the aortic valve. A common surgical approach is the Bentall procedure.
Objectives: This review examines the effectiveness, benefits, and associated complications with the Bentall surgery in AD therapy, and a comparison between valve sparing and aortic replacement methods.
Methods: A comprehensive search was conducted in online databases. The analyzed publications included original research articles, meta-analyses, review papers, clinical guidelines, seminar articles, comparative studies, and retrospective case series.
Results: Both mechanical and biological composite grafts are viable options, with no definitive evidence favoring one over the other in terms of major complications or long-term survival; however, mechanical prostheses may offer a slight advantage in younger patients. In select emergency cases, limited repair without root replacement may yield favorable short-term outcomes, though current data are insufficient to draw firm conclusions. Emerging techniques, such as the ENDO-Bentall, represent promising innovations that may enhance procedural safety and expand treatment options.
Conclusions: The Bentall procedure remains the cornerstone in the surgical management of acute type A aortic dissection, particularly when the aortic root or valve is compromised.

KEYWORDS

Aortic Dissection Treatment, Bentall Procedure, Aortic Valve Replacement, Aortic Valve Sparing

CITATION

Tomasz Furgoł, Konrad Gigoń, Joanna Jureczko, Robert Kasza, Maksymilian Ratajczak, Maciej Smreczak, Marcin Jezierzański, Michał Miciak, Dominika Mularska. (2026) Bentall Procedure in the Treatment of Aortic Dissection (AD) – Current State of Knowledge and Literature Review. *International Journal of Innovative Technologies in Social Science*. 2(50). doi: 10.31435/ijitss.2(50).2026.5662

Introduction

Aortic dissection (AD) is a rare condition affecting one of the main arteries of the circulatory system. The pathophysiology of the disease involves damage to the individual layers of the aorta, leading to the formation of an abnormal blood flow channel. This can result in acute tissue perfusion disorders, followed by other severe complications. Hypertension and immune system activation play the most significant roles in the development of AD. Activated leukocytes release various substances, primarily IL-6, tumor necrosis factor (TNF), vascular endothelial growth factor (VEGF), and monocyte chemoattractant proteins 1 and 2 (MCP-1 and MCP-2), which trigger an inflammatory process within the aortic wall. This chronic inflammation disrupts the structure and cellular connections between the layers. Combined with elevated blood pressure, it leads to tissue degradation and loss of structural integrity, particularly in the media, ultimately contributing to AD (Yin et al, 2023; Nienaber et al, 2016; Furgoł et al, 2024). Prognosis depends on the location and duration of the dissection. The annual incidence of the more prognostically severe type A AD (TAAD) is 3 per 100,000 people. This number increases to 35 per 100,000 in individuals aged 65–75 (Senser, Misra & Henkin, 2021). The five-year survival rate for patients with acute AD ranges from 55% to 85%. The mortality rate for untreated TAAD increases by 1–2% per hour after diagnosis, exceeding 50% after approximately 48 hours (Yuan, Mitsis, & Nienaber, 2022). The primary risk factors for developing AD include age over 65, hypertension (affecting more than 80% of patients), and atherosclerotic changes, which are present in over 31% of AD cases (Yin et al, 2022). The primary classification of AD is based on its duration. According to the clinical presentation, the disease is categorized into four phases: hyperacute (<24 hours), acute (1–14 days), subacute (14–90 days), and chronic (>90 days) (ESC Scientific Document Group, 2024). The second most important classification is based on the anatomical location of the dissection. Currently, there are two classification systems: DeBakey and

Stanford (Rylski, Schilling & Czerny, 2023). Surgical management of AD involves resecting the affected segment of the ascending aorta and replacing it with a synthetic graft. AD can lead to secondary damage to the aortic valve. In such cases, aortic valve replacement is performed alongside graft implantation, known as the Bentall procedure. Other surgical techniques include the David valve-sparing procedure, Yacoub procedure and the use of supracoronary grafts. Several innovative methods are currently under clinical investigation (Writing Committee Members ACC/AHA, 2023).

In this review study, we will focus on Bentall technique for AD. We will present the benefits of this method, its effectiveness and describe the most common complications associated with its use.

Materials and Methods

A comprehensive search was conducted in online databases (PubMed, PubMed Central, and Google Scholar) using the phrases related to: "aortic dissection treatment", "Bentall procedure", "aortic valve replacement" and "aortic valve sparing". After reviewing over 360 abstracts, studies that best represented the maintained topic of AD were selected (Figure 1). The analyzed publications included original research articles, meta-analyses, review papers, clinical guidelines, seminar articles, comparative studies, and retrospective case series. The selected articles were published in English and Polish.

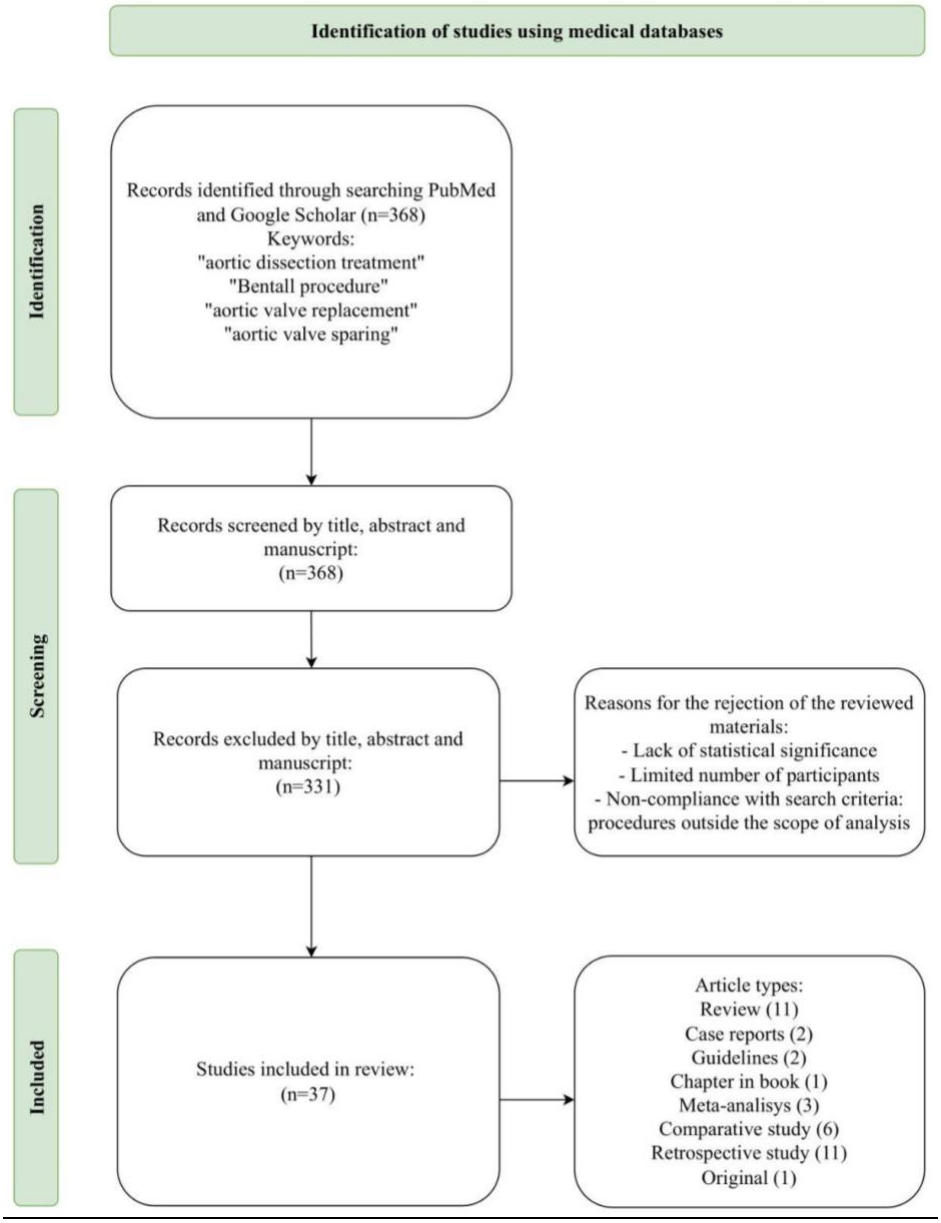

Fig. 1. *Review study selection process.*

The Bentall procedure

The Bentall surgery involves the complete replacement of the aortic root along with the aortic valve. Because of this, the procedure is indicated when a vascular disease is accompanied by valvular pathology. A common indication for this operation is acute TAAD combined with severe aortic regurgitation (Saw et al, 2020). Other indications include ascending aortic aneurysm with aortic valve dysfunction, aortic rupture, intramural hematoma, and aortic valve destruction due to endocarditis or calcification (Chakos & Yan, 2020). A notable modification of this procedure is the mini-Bentall operation, which utilizes a minimally invasive approach via ministernotomy (Di Eusanio et al, 2019). The Bentall procedure is the most frequently performed surgery for acute TAAD and remains the gold standard for treating this condition (Khachatryan et al, 2021; Mookhoek et al, 2016). The prosthetic valve used in this procedure can be both biological (biological Bentall – BB) or mechanical (mechanical Bentall – MB). Each type has its advantages and disadvantages. The primary drawback of mechanical prostheses is the lifelong need for anticoagulation therapy. However, they offer superior mechanical durability (Pantaleo et al, 2017; Beckmann et al, 2016).

The most common complications following the Bentall procedure are related to the function of the aortic prosthesis. Key factors affecting valve performance include leaflet degeneration in biological valves, thrombi formation, endocarditis, and vegetation development on the graft surface. Other significant complications include hematomas, anastomotic leaks, and pseudoaneurysms. Less frequent complications include aortic stenosis and dissection of the coronary artery ostia. The imaging modality of choice for postoperative complication assessment is CT angiography. Additional useful imaging techniques include echocardiography and, less commonly, PET-CT, which is particularly valuable in suspected infections. After the Bentall procedure, imaging studies are recommended both for suspected complications and for routine follow-up in asymptomatic patients (Boccalini et al, 2019).

Results

The choice between BB and MB depends on multiple factors. In a 2017 study, Pantaleo et al. analyzed early mortality, morbidity, late complications, and the need for reoperation in patients who underwent aortic root replacement (ARR) with either BB or MB. Among 1112 patients operated on between 1978 and 2011, two groups of 138 individuals with BB and MB were compared. In the MB group, 10 patients (7.2%) and in the BB group, 15 patients (10.9%) had TAAD and/or intramural hematoma as the surgical indication for ARR. Therefore, the interpretation of the results described below should take into account this limited subgroup of patients. In-hospital mortality outcomes were comparable between groups (MB – 7.2%, BB – 5.8%, $p = 0.6$). Similar results were observed at the 40-month follow-up. No need of re-intervention on the proximal aorta at 1, 5, and 7 years was 99.1% ± 0.9% (cumulative for all observations) in the MB group, compared to 98.4% ± 1.1%, 93.0% ± 3.2%, and 93.0% ± 3.2% in the BB group ($p = 0.07$). The authors concluded that the choice of graft type does not appear to significantly impact the rate of early or late complications or the need for reintervention (Pantaleo et al, 2017). Chen et al. analyzed outcomes in patients who underwent the Bentall procedure between 2001 and 2018. The study included 351 patients (33.4%) with BB (Bioprosthetic Prothesis) and 701 patients (66.6%) with MB (Mechanical Protesis). Aortic dissection was the most common surgical indication, observed in 45.8% of the total cohort (1,052 patients), including 37.6% of patients in the BB group and 49.9% in the MB group. No significant differences were observed between the groups in terms of in-hospital mortality (odds ratio: 0.96 [95% CI, 0.77–1.19]; $p = 0.716$) or overall mortality (34.1% versus 38.1%; odds ratio: 0.90 [95% CI, 0.78–1.04]; $p = 0.154$). The survival advantage associated with mechanical valves was more pronounced in younger patients and remained significant up to approximately 50 years of age (Chen et al, 2024).

A 2022 study analyzed mid-term outcomes of ARR using biological valve grafts. The study included 91 patients, predominantly male (74%), with a mean age of 70 ± 10 years. In most cases, the indication for surgery was an aortic aneurysm (n = 65, 72%). Sixteen procedures were performed on an emergency basis (18%), including 10 cases of acute TAAD (11%). The interpretation of the results should be considered with caution, given the small number of TAAD cases in the cohort. The overall perioperative mortality rate was 8% (n = 8). This group included two patients who underwent surgery for acute TAAD, one died due to massive hemorrhagic stroke, and the other from acute right ventricular failure within the first week. Additionally, one acute TAAD patient experienced acute respiratory distress syndrome (ARDS) postoperatively. Early mortality at one-year follow-up was 2%, while mid-term mortality at four years was 4%. Hemodynamic valve deterioration criteria were met by 10 patients (13%) after one year, and 14 patients (17%) met the criteria for valve failure over the entire follow-up period (Botea et al, 2022).

Discussion

A key consideration regarding the Bentall procedure is its application in emergency situations related to ascending aortic pathology. One study analyzed outcomes in patients who underwent the Bentall procedure due to acute TAAD and/or ascending aortic enlargement with aortic valve dysfunction. The total follow-up period was three years. The study was a retrospective single-center analysis. Fourteen patients underwent emergency surgery, with nine operated on within 24 hours of admission due to cardiac tamponade. In the remaining cases, the procedure was performed within two to seven days. Early postoperative complications occurred in five patients (Al-Mudhaffar et al, 2023). In the context of acute TAAD, a significant concern is the accompanying damage or pathology of the aortic root. In such cases, simultaneous ARR is often performed along with the dissection repair. Nishida et al. compared the short- and long-term outcomes of patients who underwent surgery for AD aneurysm with and without ARR. Indications for simultaneous aortic root surgery included a root diameter >45 mm and/or intimal injury. A total of 40 patients (12.7%) underwent ARR, while 276 patients (87.3%) were classified in the non-ARR group. In-hospital mortality was 12.5% in the ARR group and 4.7% in the non-ARR group ($p = 0.05$). Overall survival at three and five years was 84.8% and 84.8% in the ARR group, compared to 91.9% and 91.9% in the non-ARR group ($p = 0.078$). Late aortic root-related complications were observed in 11.6% of non-ARR patients but in none of the ARR patients ($p = 0.029$). Simultaneous aortic root surgery significantly reduced the risk of late aortic root complications. The higher mortality rate in the ARR group was likely due to the selection criteria, which included extensive coronary artery dissection and aortic root rupture, both contributing to an unstable preoperative condition (Nishida et al, 2016).

When comparing the Bentall and David procedures, which involve ARR, Biancari et al. observed that the Bentall procedure was preferred for older patients (58.8 ± 12.7 years) compared to the David procedure (54.8 ± 13.4 years). In their studies, no statistically significant differences in postoperative complications were found between the cohorts. The exception was the frequency of dialysis, which was significantly higher in patients who underwent the Bentall procedure (17.4% compared to 7.0%, $p = 0.016$). In the non-comparable cohorts regarding the David procedure, some differences were observed, but their interpretation is limited. The David procedure was associated with a lower 10-year mortality rate (30.1% compared to 45.6%, $p = 0.004$), but no differences were found in terms of reoperation of the proximal aorta after 10 years (3.9% compared to 4.1%, $p = 0.954$). After propensity score matching, the difference in 10-year mortality rate did not persist (30.0 % vs. 43.9%, $p = 0.082$) (Biancari et al, 2024).

One of the innovative methods is the ENDO-Bentall procedure described by Rylski et al., which is based on the Bentall procedure but is less invasive. It has many potential applications, but still requires further improvements before it can be permanently implemented, as the authors note that it carries the risk of a new proximal entry induced by the stent-graft (Rylski, Schilling & Czerny, 2023). Another innovative method involves the use of felt strips at the anastomosis site. Takago et al. described this technique and compared it to similar methods that use adhesives. In this case, felt strips improved patient outcomes, as they were not toxic to tissues. They also demonstrated that this technique reduces the time of hypothermia and extracorporeal circulation in patients (Takago, Nishida, & Koyama, 2023).

The systematic review by Soto et al. analyzed patients with connective tissue disorders (Marfan, Loeys-Dietz, Beals-Hecht, or Ehlers-Danlos syndromes) who had aortic aneurysms and/or dissections, comparing valve-sparing (VS) procedures (e.g. preserving, remodeling, reimplantation, Yacoub, David or Florida Sleeve) and valve replacement (VR) procedures (e.g. repair, Bentall, Button-Bentall, composite valve graft or Cabrol). The review did not perform a separate, detailed analysis specifically on how VS and VR procedures compare only in patients who presented with AD at the time of their initial surgery. The outcomes are reported for the combined group of patients with aneurysm and/or AD. The study included 1807 VS and 2218 VR cases, with 10.3% and 38.5% respectively presenting with AD at the time of surgery. Both approaches were used in AD cases, and the results showed that postoperative dissection rates were low: 0% (0–0.6%) for VS and 1.0% (0.5– 1.8%) for VR, with no statistically significant difference between them ($p = 0.126$) (Soto et al, 2021).

In a single-center study, Dib et al. analyzed outcomes of 407 patients who underwent surgery for acute TAAD and its impact over a 25-year period. Surgical approaches were grouped into VS and VR techniques. The VS procedures (David or Yacoub) were performed on 29 patients (7%), which showed the best outcomes, with the lowest 30-day mortality (14%) and highest 10-year survival (69.6%). In contrast, VR methods including supracommissural replacement (SCR) and composite replacement (COMP), with or without total arch replacement (TAR) (SCR + TAR – 75 patients/18%, COMP – 119 patients/29%, COMP + TAR – 27 patients/7%), had higher early mortality (18–25%) and lower long-term survival (34.3–46.1%). While overall 30-day mortality differences were not significant, VS demonstrated superior 10-year survival (Dib et

al, 2019). The final summary and comparison of the AD treatment procedures described in this study are presented in Table 1.

Table 1. The summary of indications, contraindications, advantages and disadvantages of studied treatment methods for aortic dissection [10,11,14,17,18,27–37].

AD treatment method	Indications	Contraindications	Advantages	Disadvantages
Bentall procedure (total aortic root replacement with aortic valve)	1. Acute TAAD combined with severe aortic regurgitation 2. Dilation of the proximal aorta along with aortic valve abnormality 3. Aortic rupture 4. Intramural hematoma 5. Destruction of the aortic valve associated with endocarditis or calcification	1. Patient contraindications to anticoagulants or medication refusal	1. The most favorable method in cases of simultaneous damage to the ascending aorta and aortic valve	1. Valve-related complications (degeneration of biological valve leaflets, the presence of thrombi, endocarditis, vegetation on the surface of the graft 2. Hematomas 3. Leaks from the suture site 4. Pseudoaneurysms
David procedure (aortic root replacement with aortic valve preservation)	1. Pathologically altered ascending aorta with dilated aortic annulus	1. Abnormal coaptation of the aortic valve leaflets 2. Severe calcification with bicuspid aortic valve morphology 3. Aortic valve stenosis found in echocardiography	1. Preservation of the native aortic valve, leading to more physiological valve function and eliminating the lifetime requirement for anticoagulation drugs	1. Risk of subsequent aortic valve failure (compared to Bentall procedure) 2. Prolongation of myocardial ischemia time
Supracoronary graft (aortic valve suspension and aortic root reconstruction with supra-aortic graft implantation	1. Performing the procedure by personnel with limited skills 2. Surgery in a patient with acute AD on an emergency basis 3. Elderly patients with multi-morbidity	1. Ruptured internal membrane in the aortic root 2. Connective tissue diseases 3. Diameter of the aortic root exceeding 45 mm 4. Irreversible pathologies of the aortic valve	1. Shortest procedure time 2. Ability to perform the procedure by personnel with limited skills	1. Acute renal failure 2. Postoperative hemorrhage requiring surgical re-intervention 3. Neurological complications 4. ARDS

AD – aortic dissection; ARDS – acute respiratory distress syndrome; ARr – aortic root reconstruction; ARR – aortic root replacement; TAAD – type A aortic dissection.

Conclusions

The Bentall procedure remains the cornerstone in the surgical management of acute type A aortic dissection, particularly when the aortic root or valve is compromised. Both mechanical and biological composite grafts are viable options, with no definitive evidence favoring one over the other in terms of major complications or long-term survival; however, mechanical prostheses may offer a slight advantage in younger patients. In select emergency cases, limited repair without root replacement may yield favorable short-term outcomes, though current data are insufficient to draw firm conclusions. Emerging techniques, such as the ENDO-Bentall, represent promising innovations that may enhance procedural safety and expand treatment options. The interpretation of outcomes remains challenging, as many studies are based predominantly on cohorts with aortic aneurysms, which limits the applicability of their findings to patients with acute TAAD. As a result, numerous studies are either unsuitable for analysis in the context of dissection or provide only limited data. There is a clear need for dedicated studies focusing exclusively on patients with acute TAAD, ideally with stratification by surgical technique.

REFERENCES

1. Yin, Z. Q., Han, H., Yan, X., & Zheng, Q. J. (2023). Research progress on the pathogenesis of aortic dissection. *Current Problems in Cardiology, 48*(8), 101249. https://doi.org/10.1016/j.cpcardiol.2022.101249
2. Nienaber, C. A., Clough, R. E., Sakalihasan, N., Suzuki, T., Gibbs, R., Mussa, F., Jenkins, M. P., Thompson, M. M., Evangelista, A., Yeh, J. S. M., Cheshire, N., Rosendahl, U., & Pepper, J. (2016). Aortic dissection. *Nature Reviews Disease Primers, 2*(1), Article 16053. https://doi.org/10.1038/nrdp.2016.53
3. Furgoł, T., Antończyk, R., Miciak, M., Jezierzański, M., Smreczak, M., Gigoń, K., Fogiel, O., Ratajczak, M., & Hrapkowicz, T. (2024). Inflammatory response induction as a result of BioGlue adhesive application in cardiac surgery—A review of the literature. *Kardiochirurgia i Torakochirurgia Polska, 21*(1), 43–46. https://doi.org/10.5114/kitp.2024.138566
4. Senser, E. M., Misra, S., & Henkin, S. (2021). Thoracic aortic aneurysm: A clinical review. *Cardiology Clinics, 39*(4), 505–515. https://doi.org/10.1016/j.ccl.2021.06.003
5. Yuan, X., Mitsis, A., & Nienaber, C. A. (2022). Current understanding of aortic dissection. *Life, 12*(10), 1606. https://doi.org/10.3390/life12101606
6. Yin, J., Liu, F., Wang, J., Yuan, P., Wang, S., & Guo, W. (2022). Aortic dissection: Global epidemiology. *Cardiology Plus*. Advance online publication. https://doi.org/10.1097/cp9.0000000000000028
7. Mazzolai, L., Teixido-Tura, G., Lanzi, S., Boc, V., Bossone, E., Brodmann, M., Bura-Rivière, A., De Backer, J., Deglise, S., Della Corte, A., Heiss, C., Kałużna-Oleksy, M., Kurpas, D., McEniery, C. M., Mirault, T., Pasquet, A. A., Pitcher, A., Schaubroeck, H. A. I., Schlager, O., . . . ESC Scientific Document Group. (2024). 2024 ESC guidelines for the management of peripheral arterial and aortic diseases. *European Heart Journal, 45*(36), 3538–3700. https://doi.org/10.1093/eurheartj/ehae179
8. Rylski, B., Schilling, O., & Czerny, M. (2023). Acute aortic dissection: Evidence, uncertainties, and future therapies. *European Heart Journal, 44*(10), 813–821. https://doi.org/10.1093/eurheartj/ehac757
9. Isselbacher, E. M., Preventza, O., Hamilton Black, J., III, Augoustides, J. G., Beck, A. W., Bolen, M. A., Braverman, A. C., Bray, B. E., Brown-Zimmerman, M. M., Chen, E. P., Collins, T. J., DeAnda, A., Jr., Fanola, C. L., Girardi, L. N., Hicks, C. W., Hui, D. S., Jones, W. S., Kalahasti, V., Kim, K. M., . . . Woo, Y. J. (2023). 2022 ACC/AHA guideline for the diagnosis and management of aortic disease: A report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. *The Journal of Thoracic and Cardiovascular Surgery, 166*(5), e182–e331. https://doi.org/10.1016/j.jtcvs.2023.04.023
10. Saw, L. J., Lim-Cooke, M. S., Woodward, B., Othman, A., & Harky, A. (2020). The surgical management of acute type A aortic dissection: Current options and future trends. *Journal of Cardiac Surgery, 35*(9), 2286–2296. https://doi.org/10.1111/jocs.14733
11. Chakos, A., & Yan, T. D. (2020). Bentall and mini-Bentall procedure. In *Cardiac surgery* (pp. 307–314). Springer. https://doi.org/10.1007/978-3-030-24174-2_34
12. Di Eusanio, M., Cefarelli, M., Zingaro, C., Capestro, F., Matteucci, S. M. L., D'Alfonso, A., Pierri, M. D., Aiello, M. L., & Berretta, P. (2019). Mini Bentall operation: Technical considerations. *Indian Journal of Thoracic and Cardiovascular Surgery, 35*(Suppl. 2), 87–91. https://doi.org/10.1007/s12055-018-0669-4
13. Khachatryan, Z., Leontyev, S., Magomedov, K., Haunschild, J., Holzhey, D. M., Misfeld, M., Etz, C. D., & Borger, M. A. (2021). Management of aortic root in type A dissection: Bentall approach. *Journal of Cardiac Surgery, 36*(5), 1779–1785. https://doi.org/10.1111/jocs.15271
14. Mookhoek, A., Korteland, N. M., Arabkhani, B., Di Centa, I., Lansac, E., Bekkers, J. A., Bogers, A. J., & Takkenberg, J. J. (2016). Bentall procedure: A systematic review and meta-analysis. *The Annals of Thoracic Surgery, 101*(5), 1684–1689. https://doi.org/10.1016/j.athoracsur.2015.10.090
15. Pantaleo, A., Murana, G., Di Marco, L., Jafrancesco, G., Barberio, G., Berretta, P., Leone, A., Di Bartolomeo, R., & Pacini, D. (2017). Biological versus mechanical Bentall procedure for aortic root replacement: A propensity score analysis of a consecutive series of 1112 patients. *European Journal of Cardio-Thoracic Surgery, 52*(1), 143–149. https://doi.org/10.1093/ejcts/ezx070
16. Beckmann, E., Martens, A., Alhadi, F. A., Ius, F., Koigeldiyev, N., Fleissner, F., Stiefel, P., Kaufeld, T., Haverich, A., & Shrestha, M. (2016). Is Bentall procedure still the gold standard for acute aortic dissection with aortic root involvement? *The Thoracic and Cardiovascular Surgeon, 64*(2), 116–123. https://doi.org/10.1055/s-0035-1552580
17. Boccalini, S., Swart, L. E., Bekkers, J. A., Nieman, K., Krestin, G. P., Bogers, A. J., & Budde, R. P. (2019). CT angiography for depiction of complications after the Bentall procedure. *The British Journal of Radiology, 92*(1093), 20180226. https://doi.org/10.1259/bjr.20180226
18. Goebel, N., Nagib, R., Salehi-Gilani, S., Ahad, S., Albert, M., Ursulescu, A., & Franke, U. F. W. (2019). Combined David and frozen elephant trunk procedure in acute aortic dissection. *The Thoracic and Cardiovascular Surgeon, 67*(5), 372–378. https://doi.org/10.1055/s-0038-1667179
19. Chen, C. Y., Chen, C. Y., Chang, F. C., Cheng, Y. T., Wu, V. C., Lin, C. P., Chan, Y. H., Hung, K. C., Chu, P. H., & Chen, S. W. (2024). Mechanical versus bioprosthetic aortic valve replacement in patients undergoing Bentall procedure. *Journal of the American Heart Association, 13*(1), e030328. https://doi.org/10.1161/JAHA.123.030328

20. Botea, R., Lavie-Badie, Y., Goicea, A., Porterie, J., & Marcheix, B. (2022). Early and midterm outcomes of a Bentall operation using an all-biological valved BioConduit™. *Journal of Cardiothoracic Surgery, 17*(1), 325. https://doi.org/10.1186/s13019-022-02073-5
21. Al-Mudhaffar, S. S., Alwan, A., Ouj, R., Mowaffaq, A., Kakamad, F. H., Ahmad, O. F., Mohammed-Saeed, D. H., Ali, R. K., Abdalla, B. A., Mohammed, S. H., & Salih, A. M. (2023). Bentall procedure as a lifesaving surgery: A single center experience. *Medicine International, 3*(1), 8. https://doi.org/10.3892/mi.2023.68
22. Nishida, H., Tabata, M., Fukui, T., & Takanashi, S. (2016). Surgical strategy and outcome for aortic root in patients undergoing repair of acute type A aortic dissection. *The Annals of Thoracic Surgery, 101*(4), 1464–1469. https://doi.org/10.1016/j.athoracsur.2015.10.007
23. Biancari, F., Mastroiacovo, G., Rinaldi, M., Ferrante, L., Mäkikallio, T., Juvonen, T., Mariscalco, G., El-Dean, Z., Pettinari, M., Rodriguez Lega, J., Pinto, A. G., Perrotti, A., Onorati, F., Wisniewski, K., Demal, T., Kacer, P., Rocek, J., Di Perna, D., Vendramin, I., . . . Peterss, S. (2024). The David versus the Bentall procedure for acute type A aortic dissection. *Journal of Cardiovascular Development and Disease, 11*(11), 370. https://doi.org/10.3390/jcdd11110370
24. Takago, S., Nishida, S., & Koyama, K. (2023). Novel reinforcement technique using pre-glued felt strip with Hydrofit® for a distal anastomotic site in acute type A aortic dissection. *General Thoracic and Cardiovascular Surgery, 71*(10), 591–594. https://doi.org/10.1007/s11748-023-01944-5
25. Soto, M. E., Ochoa-Hein, E., Anaya-Ayala, J. E., Ayala-Picazo, M., & Koretzky, S. G. (2021). Systematic review and meta-analysis of aortic valve-sparing surgery versus replacement surgery in ascending aortic aneurysms and dissection in patients with Marfan syndrome and other genetic connective tissue disorders. *Journal of Thoracic Disease, 13*(8), 4830–4844. https://doi.org/10.21037/jtd-21-789
26. Dib, B., Seppelt, P. C., Arif, R., Weymann, A., Veres, G., Schmack, B., Beller, C. J., Ruhparwar, A., Karck, M., & Kallenbach, K. (2019). Extensive aortic surgery in acute aortic dissection type A on outcome—Insights from 25 years single center experience. *Journal of Cardiothoracic Surgery, 14*(1), 187. https://doi.org/10.1186/s13019-019-1007-7
27. Yang, B., Patel, H. J., Sorek, C., Hornsby, W. E., Wu, X., Ward, S., Thomas, M., Driscoll, A., Waidley, V. A., Norton, E. L., Likosky, D. S., & Deeb, G. M. (2018). Sixteen-year experience of David and Bentall procedures in acute type A aortic dissection. *The Annals of Thoracic Surgery, 105*(3), 779–784. https://doi.org/10.1016/j.athoracsur.2017.09.029
28. Wu, Q., Wang, Z., Qiu, Z., Shen, Y., Chen, X., Chen, X., & Chen, L. (2021). Mid-term outcomes of modified valve-sparing aortic root replacement versus the Bentall procedure for middle-aged Chinese patients with acute DeBakey I aortic dissection: A single-center retrospective study. *BMC Cardiovascular Disorders, 21*(1), 196. https://doi.org/10.1186/s12872-021-02014-5
29. Chan, V., Malas, T., Lapierre, H., Boodhwani, M., Lam, B. K., Rubens, F. D., Hendry, P. J., Masters, R. G., Goldstein, W., Mesana, T. G., & Ruel, M. (2011). Reoperation of left heart valve bioprostheses according to age at implantation. *Circulation, 124*(11 Suppl.), S75–S80. https://doi.org/10.1161/CIRCULATIONAHA.110.011973
30. Biskupski, A., Waligórski, S., Mokrzycki, K., & Brykczyński, M. (2016). Postponed surgery of an acute aortic dissection (type A) in a Jehovah's Witness with significant hemostatic disorders. *Kardiochirurgia i Torakochirurgia Polska, 13*(3), 251–253. https://doi.org/10.5114/kitp.2016.62616
31. Yang, B., Norton, E. L., Hobbs, R., Farhat, L., Wu, X., Hornsby, W. E., Kim, K. M., Patel, H. J., & Deeb, G. M. (2019). Short- and long-term outcomes of aortic root repair and replacement in patients undergoing acute type A aortic dissection repair: Twenty-year experience. *The Journal of Thoracic and Cardiovascular Surgery, 157*(6), 2125–2136. https://doi.org/10.1016/j.jtcvs.2018.09.129
32. Valdis, M., Adams, C., Chu, M. W. A., Kiaii, B., & Guo, L. (2017). Comparison of outcomes of root replacement procedures and supracoronary techniques for surgical repair of acute aortic dissection. *Canadian Journal of Surgery, 60*(3), 198–204. https://doi.org/10.1503/cjs.009116
33. Chen, S. K., Qiu, Z. H., Fang, G. H., Wu, X. J., & Chen, L. W. (2019). Reported outcomes after aortic valve resuspension for acute type A aortic dissection: A systematic review and meta-analysis. *Interactive Cardiovascular and Thoracic Surgery, 29*(3), 331–338. https://doi.org/10.1093/icvts/ivz080
34. Bugajski, P., Greberski, K., Buszkiewicz, K., Jarząbek, R., Jedliński, I., & Kalawski, R. (2011). Ascending aorta dissection complicated by acute myocardial infarction and cardiogenic shock in a patient with Marfan syndrome. *Kardiochirurgia i Torakochirurgia Polska, 8*(3), 391–393.
35. Lee, H., Cho, Y. H., Sung, K., Kim, W. S., Park, K. H., Jeong, D. S., Park, P. W., & Lee, Y. T. (2018). Clinical outcomes of root reimplantation and Bentall procedure: Propensity score matching analysis. *The Annals of Thoracic Surgery, 106*(2), 539–547. https://doi.org/10.1016/j.athoracsur.2018.02.057
36. Hartley, P., Salmasi, M. Y., Morosin, M., Mensah, K., & Asimakopoulos, G. (2022). Comparison of outcomes between aortic root replacement and supra-coronary interposition graft for type A aortic dissection: A retrospective case series. *Journal of Cardiac Surgery, 37*(12), 4398–4405. https://doi.org/10.1111/jocs.16985
37. Saeidi, M., Movahedi, M., Rafiee Zadeh, A., Shirvany, F., & Saeidi, M. (2022). Outcomes of supra coronary aortic repair technique in patients with acute aortic dissection type A. *American Journal of Cardiovascular Disease, 12*(4), 247–253.