

Controversial Focus and International Consensus Interpretation of Medical and Interventional Therapy for Type B IMH

Yucheng Gao ^a, Hongwei Lei ^{*}

Department of Radiology, The First Affiliated Hospital of Yangtze University, Jingzhou, Hubei, 434000, China

^{*} Corresponding author: Hongwei Lei (Email: sslhw@sina.com), ^a 1228479261@qq.com

Abstract: Type B Intramural Aortic Hematoma (IMH) is an important subtype of acute aortic syndrome, and its clinical management has long been debated between conservative medical therapy and interventional therapy via Thoracic Endovascular Aortic Repair (TEVAR). Medical therapy mainly relies on strict blood pressure and heart rate control, advocating conservative management and long-term follow-up observation for uncomplicated cases. By contrast, interventional therapy features minimal trauma, which can effectively prevent disease progression and reduce the risk of long-term complications in the management of complicated cases. Nevertheless, divergent opinions still exist regarding its indications, timing of intervention, and the balance between risks and benefits. This article comprehensively summarizes the controversial issues concerning medical and interventional therapy for Type B IMH. Based on international multidisciplinary consensus documents issued in recent years, it analyzes the respective scope of application, clinical significance and underlying decision-making logic of the two therapeutic approaches, so as to formulate individualized treatment strategies for patients at different risk levels and provide theoretical support for standardized clinical diagnosis and treatment.

Keywords: Type B Intramural Aortic Hematoma; Medical Therapy; Thoracic Endovascular Aortic Repair; Therapeutic Controversy; International Consensus.

1. Preface

Type B intramural aortic hematoma (IMH) is defined as hematoma formation between the aortic media and adventitia caused by blood penetrating the aortic intima, without a distinct intimal tear. Together with classic aortic dissection and penetrating atherosclerotic ulcer, it constitutes the acute aortic syndrome.

Compared with type B IMH, the lesions of type B IMH are in the descending aorta and have mild initial clinical symptoms. However, there is a risk that it will develop into a typical aortic dissection, an aneurysm or even rupture, so timely treatment and extended follow-up are necessary.

For patients with uncomplicated type B IMH, conservative medical therapy has been the main way to treat it for a long time in clinical practice because it is safe and effective. With the spread of thoracic endovascular aortic repair (TEVAR), interventional therapy has been gradually added to the treatment of complex cases and some high-risk uncomplicated cases because it is minimally invasive and has a short lesion-free period.

There are still disagreements in clinical practice over which patients should receive either of the two types of therapy. Guidelines and consensus statements from different regions and disciplines are also inconsistent. With the development of imaging technology, the accumulation of clinical evidence and the maturation of multidisciplinary cooperation, an international risk-stratified treatment consensus has been formed, but some detailed problems have not been further clarified.

Based on clinical experience and new research results, this paper will discuss the controversial problems of medical therapy and intervention for type B IMH in detail, explore the main content of international consensus, and provide support

for the optimisation of clinical decision-making and standardisation of therapeutic procedures

2. Pathophysiological Characteristics and Core Therapeutic Objectives of Type B IMH

2.1. Pathophysiological Characteristics and Clinical Risk Stratification

The pathological mechanism of type B intramural aortic hematoma (IMH) is mainly due to the rupture of vasa vasorum in the aortic media and subsequent blood accumulation; it is often associated with underlying diseases such as hypertension, atherosclerosis and cystic medial necrosis of the aorta.

A hematoma has formed and is thus reducing the true aortic lumen by compressing it. Progressive enlargement of the hematoma may result in an intimal tear and progress to a classic aortic dissection, or it may lead to thinning of the aortic wall with aneurysmal degeneration and thus increase the risk of aortic rupture.

Types of B IMH can be classified into serious and minor based on the extent of the lesion and its prognosis clinically. The severe type is relatively more serious, has obvious symptoms, may be associated with hemodynamic instability, prolonged chest pain, resistant hypertension, significant increase in the diameter of the aorta, increased thickness of the haematoma, ulcer-like protrusions and pericardial or pleural effusion. The simple type does not have the above high-risk signs and is relatively stable; however, it is still at risk of long-term development of the disease [1].

2.2. Core Therapeutic Objectives and Principles

The therapeutic objectives of type B IMH are consistent, namely to control the acute condition, halt lesion progression, and prevent aortic rupture and conversion to classic aortic dissection in the acute phase; in the chronic phase, to delay aneurysmal dilatation of the aorta, reduce the risks of long-term complications and mortality, and improve long-term quality of life.

Treatment should not exacerbate the disease by inducing new iatrogenic complications. Therapeutic decisions ought to be individualized based on patients' clinical symptoms, imaging findings, underlying diseases and general physical status.

Both medical therapy and interventional treatment are implemented in accordance with the above objectives and principles. Medical therapy regulates hemodynamics and arrests disease progression via systemic medication, representing an indirect intervention [2]. Interventional therapy achieves hematoma exclusion and aortic wall stabilization through local stent implantation, which serves as a direct therapeutic approach.

3. Clinical Application and Controversies of Medical Therapy for Type B IMH

3.1. Regimen and Core Mechanism of Medical Therapy

Medical treatment is the primary way to manage type B intramural aortic haematoma (IMH) in patients without severe cases of type B IMH. The main strategy is anti-impulse therapy, which is a combination of antihypertensive drugs, heart rate-lowering drugs, analgesics, lipid-lowering drugs, etc.

Most of the antihypertensive drugs are IV beta-blockers; they can lower the top number of blood pressure to 100-120 mmHg and heart rate to 60-80 beats per minute quickly. It can reduce the rate of left ventricular ejection and lower the stress on the aortic wall to ease hemodynamic stress on the hematoma and prevent further enlargement of the hematoma.

If the blood pressure is still high, then add a vasodilator, such as sodium nitroprusside. However, they should be given based on the beta-blocker and not trigger a reflex increase in heart rate that would worsen the condition.

Analgesics can reduce the pain of the chest and lessen sympathetic nerve activity; thus, blood pressure may fall. Lipid-lowering therapy can reduce the causes of atherosclerosis and slow down the development of intimal lesions and reduce the risk of hematoma[3].

3.2. Controversial Focus of Medical Therapy

Controversies remain regarding medical therapy for type B IMH, mainly focusing on the long-term prognostic assessment of uncomplicated cases and the suitability of medical management for high-risk subgroups. Proponents of medical therapy hold that in most patients with uncomplicated type B IMH, the hematoma can be gradually absorbed or remain stable after pharmacological intervention, with a low mortality rate in the acute phase. Meanwhile, medical treatment can avoid iatrogenic dissection, stent-related complications, peripheral vascular injury and other adverse events associated with interventional therapy. In addition,

medical therapy requires no specialized equipment and can be carried out in hospitals at all levels. It is suitable for primary care and early emergency treatment, and conforms to the principle of health economics [4].

4. Clinical Application and Controversies of Interventional Therapy (TEVAR) for Type B IMH

4.1. Technical Principle and Clinical Advantages of Interventional Therapy

Thoracic Endovascular Aortic Repair (TEVAR) is now an excellent option for Type B IMH. A covered stent will be placed by inserting the femoral artery and separate the diseased part of the aorta from the blood. Therefore, there will be no further changes in blood flow to the haematoma, it can be absorbed, and the wall of the aorta will be stable.

Technically speaking, the first is to precisely place the stent during deployment so that there is no hematoma at the proximal landing zone, and it should be long enough to prevent stent migration or endoleak. If there is disease of the left subclavian artery, other measures will be taken to guarantee the open state of the branch vessels, such as bypass surgery, branched stents and so on.

Compared with the old way of open surgery, TEVAR is less invasive; it has a shorter operation time, less blood loss during the operation, and recovers faster after surgery. It is very suitable for older people and those with many diseases of their internal organs or who are not in a good condition physically. According to clinical studies, TEVAR can relieve the chest pain and reduce the risk of sudden deterioration of the lesion; it helps the patient fully recover from the hematoma and lowers the incidence of long-term aortic aneurysm and reoperation. Therefore, it is now the main treatment for severe Type B IMH [5].

4.2. Controversial Focus of Interventional Therapy

The main disputes about TEVAR intervention are the expansion of indications, the optimal time for intervention and risks of the procedure.

As for the indication, traditionally it has only been used for severe type B intracranial hemorrhage that is hemodynamically unstable, has signs of imminent rupture and is difficult to control with medication. Recently, some studies have shown that in the case of high-risk but uncomplicated arterial amyloidosis, early TEVAR can help reduce the risk of long-term complications and expand the range of treatment [6]. On the other hand, some other scholars believe that interventional therapy is not beneficial in the long run for uncomplicated cases and may increase the risk of iatrogenic complications; thus, it should be considered overtreatment [7].

The problem of when to intervene has not been solved. In the hyperacute period (within the first 48 hours), there is oedema and weakness of the aortic wall; therefore, TEVAR is more likely to cause intimal injury, retrograde dissection and has a high mortality rate. The acute phase (3-14 days) and the subacute phase (>14 days) are relatively safer, but there is no general agreement on which one is more suitable for treatment.

5. Analysis of the Core Controversies Between Medical and Interventional Therapy

5.1. Controversy over the Definition of Applicable Population

Accurate definition of the applicable population is the key controversy between the two treatment modalities, whose essence lies in the correlation between risk stratification and therapeutic benefit.

Advocates of medical therapy adhere to the traditional principle of initial medical management for uncomplicated cases and primary interventional therapy for complicated cases. They hold that uncomplicated cases can achieve favorable outcomes with medical treatment alone, and invasive procedures are unnecessary.

In contrast, proponents of interventional therapy advocate redefining high-risk uncomplicated patients based on imaging risk indicators. They argue that such patients have a high failure rate under medical therapy, and early intervention can significantly improve prognosis [8].

5.2. Controversy over the Comparison of Acute and Long-term Efficacy

In terms of acute-phase efficacy, medical therapy can stabilize hemodynamics and relieve clinical symptoms. For complicated cases, the acute mortality of medical treatment is lower than that of open surgery but higher than that of TEVAR. TEVAR can arrest disease progression more rapidly and achieve better pain relief, accompanied by a lower acute aortic-related mortality in complicated patients.

Controversy mainly exists regarding the acute efficacy of uncomplicated cases. Most studies have shown no significant difference in acute mortality between the two treatment strategies; nevertheless, TEVAR presents superior advantages in promoting hematoma absorption and preventing lesion progression [9].

There are even more debates concerning long-term efficacy. Medical therapy is associated with late aortic dilatation, even aneurysmal degeneration, as well as a considerable risk of secondary intervention. Particularly in patients with high-risk factors, the 5-year reintervention rate can exceed 20%.

5.3. Controversies on Treatment Risks and Health Economics

Risk-off is the other reason for the disagreement. The main risks of medical treatment are poor control of high blood pressure in the long term, adverse drug reactions, and worsening of the disease; they are chronic and progressive. At the same time, there are relatively more frequent and serious acute complications of TEVAR, such as iatrogenic injury in the acute stage, postoperative endoleak, spinal cord ischaemia, etc., which are more serious in terms of clinical outcomes.

Clinicians have different perceptions of risk and thus make different treatment choices. Some doctors choose to use conservative medical treatment in order to avoid the serious risks of surgery; others believe that early intervention is necessary due to the poor prognosis of the disease.

In terms of health economics, although the initial cost of medical treatment is low, it will be high due to a long period of follow-up and other necessary interventions. TEVAR is relatively expensive to purchase upfront, but it can help us avoid the financial strain of a second operation in the later

stages; so far, we have not been able to assess its total economic benefit.

The uneven distribution of medical resources also leads to different choices for people in different areas. Primary hospitals often do not have the necessary facilities for TEVAR; interventional therapy is available in large medical centers and is thus used more frequently in clinical practice.

6. Interpretation of International Consensus on the Treatment of Type B IMH

6.1. Core Framework of International Multidisciplinary Consensus

In recent years, multidisciplinary international experts have gradually reached a consensus framework for the management of type B IMH. Represented by the *International Expert Consensus on the Management of Acute Type B Intramural Aortic Hematoma and Penetrating Atherosclerotic Ulcer* jointly issued by the European Association for Cardio-Thoracic Surgery and the European Society for Vascular Surgery in 2025, and referring to relevant guidelines from the United States and Asia, the principle of risk stratification and individualized treatment has been proposed.

The consensus clearly classifies type B IMH into three categories: complicated type, high-risk uncomplicated type, and low-risk uncomplicated type, and formulates corresponding therapeutic strategies for each stratification. It emphasizes multidisciplinary collaboration, in which departments including cardiology, vascular surgery, interventional radiology and medical imaging jointly conduct evaluation and clinical decision-making. With patient safety as the primary priority, clinicians are recommended to balance the benefits and risks of treatment [10].

6.2. Consensus Recommendations for Medical Therapy

Internationally, medical therapy is generally regarded as the first-line treatment for low-risk uncomplicated type B intracranial hemorrhage (ICH) and constitutes the foundation of all treatment for type B ICH.

Most of the drugs for this condition are beta-blockers, combined with vasodilators, pain relievers, lipid-lowering drugs, etc. Keep the Blood Pressure and Heart Rate within a certain range. IV infusion will be used in the first stage, and after the patient shows signs of stabilization, it will be switched to oral maintenance therapy.

Most of us have a certain number of basic indications for monitoring drug therapy. Low-risk patients can be advised to have CT angiography (CTA) follow-ups at 7, 30 and 90 days after the start of symptoms, and are then observed once a year. Change the treatment plan immediately upon worsening of the disease or appearance of high-risk signs.

There is general agreement that medicine can be taken to prevent or treat serious illness, so it is often recommended for initial treatment of acute injuries. It is believed that the simple cases without high-risk factors will have a good prognosis under standard medical management and do not require regular intervention.

Due to the limitations of medical therapy, it is believed that these deficiencies need to be addressed by precise risk classification and should not be entirely eliminated from

clinical application of medical treatment.

7. Conclusion

At the clinical level, we should no longer be divided into "treatment" and "intervention". According to the principle of risk stratification, customised and precise treatment plans should be formulated based on patients' actual health situations and symptoms, image characteristics, general health conditions, availability of local medical resources, etc.

It is also necessary to strengthen the cooperation of various disciplines and optimize the dynamic monitoring system for both the acute and chronic stages, so that the treatment plan can be adjusted in a timely manner according to changes in the disease.

In the future, with the continuous progress and enhanced precision of imaging technology, optimisation of interventional materials and techniques, and the implementation of large-scale clinical trials, the risk classification system for type B IMH will be improved further to better understand its use in therapy and at what time it is most appropriate to intervene. The disputes of the medical and interventional therapy will gradually subside. Finally, patient-centeredness, safety, efficiency, personalisation and standardisation of diagnosis and treatment will be realised to further improve the prognosis and quality of life of patients with type B IMH in the acute stage and at a later time.

References

- [1] Adam, J., Murhega, B. R., Sieleche, C., et al. (2026). Intracranial epidural hematoma after lumbar puncture in a patient with sickle cell disease: A rare case report. *Interdisciplinary Neurosurgery: Advanced Techniques and Case Management*, 44, 102250. <https://doi.org/10.1016/j.inat.2026.102250>.
- [2] Yuser, R., Fercho, J., Duszyński, K., et al. (2026). Intracranial hemorrhage after evacuation of chronic subdural hematoma: systematic review. *Neurologia i Neurochirurgia Polska*.
- [3] Sium, F. A., Basha, A. T., Mollaligne, F., et al. (2025). Intracranial acute subdural hematoma following spinal anesthesia for cesarean delivery. *Clinical Case Reports*, 13(10), e70992. <https://doi.org/10.1002/ccr3.70992>.
- [4] Fernandez, K., Khan, Z., Dowe, C., et al. (2025). Between the layers: Intracranial subdural hematoma following epidural anesthesia. *Chest*, 168(4S), A2711–A2712. <https://doi.org/10.1016/j.chest.2025.05.234>.
- [5] Schack, A., Olsen, H. M., Hansen, T. J., et al. (2025). Intracranial pressure changes during early postoperative mobilization in patients with chronic subdural hematoma. *Acta Neurochirurgica*, 167(1), 234. <https://doi.org/10.1007/s00701-024-04263-9>.
- [6] Patel, R. K., Thorell, E. W., Borg, N., et al. (2025). Distal intracranial artery pseudoaneurysm causing subdural hematoma: An illustrative case and a systematic review. *Surgical Neurology International*, 16, 224. https://doi.org/10.4103/sni.sni_134_25.
- [7] Otsuka, K., Iwasaki, T., Tanaka, R., et al. (2023). Detailed demonstration of the mechanism of acute subdural hematoma caused by ruptured intracranial aneurysm. *Neurology India*, 71(4), 781–782. <https://doi.org/10.4103/0028-3886.372411>.
- [8] Li, K., Zhang, W. Z., & Liu, J., et al. (2023). Intracranial metastasis mimicking acute epidural hematoma. *Neurology India*, 71(4), 855–856. <https://doi.org/10.4103/0028-3886.372412>.
- [9] Lopes, F. D. S., Cordeiro, C., Gomes, D., et al. (2023). Intracranial subdural hygroma: A rare complication of failed neuraxial anesthesia? *Cureus*, 15(4), e37090. <https://doi.org/10.7759/cureus.37090>.
- [10] Sandín López, E., Fernández Torres, B., & Blanco Márquez, V. (2023). Intracranial subdural hematoma during labor analgesia without apparent dural puncture. *Minerva Anestesiologica*, 89(7–8), 716–717. <https://doi.org/10.23736/S0375-9393.23.17146-X>.