2023 SICASH
SLIIT INTERNATIONAL CONFERENCE ON ADVANCEMENTS IN SCIENCES & HUMANITIES

A Case Report: Nursing Interventions of a Patient with Type B Aortic Dissection

*[1]S. M. N Subasinghe, [2]W. D. D. M. Ranasinghe, *[3]C. D. K. Dasanayake

[1,2] Post Basic College of Nursing, Colombo

[3] School of Nursing, Faculty of Humanities and Sciences, SLIIT

Email address of the corresponding author: *nilu25subasinghe@gmail.com,

ARTICLE INFO

Article History:
Received: 10 September 2023
Accepted: 01 November 2023

Keywords:
Type B abdominal aortic dissection; Aged patients; Mortality rate

Citation:

S. M. N Subasinghe*[1], W. D. D. M. Ranasinghe[2], C. D. K. Dasanayake. (2023). A Case Report: Nursing Interventions of a Patient with Type B Aortic Dissection. Proceedings of SLIIT International Conference on Advancements in Sciences and Humanities, 1-2 December, Colombo, pages 454-459.

ABSTRACT

Aortic dissection is a rare medical condition in which a tear of the aortic wall occurs. Type B aortic dissection occurs in the descending aorta and is a challenging medical emergency in the human circulatory system and may have serious complications such as renal failure, arterial dilatation or rupture, visceral branch hypo perfusion, and compromise of aneurism exclusion. Elderly patients greater than the age of 70 years with type B aortic dissection have the most striking mortality rate. A seventy-year-old woman with a history of acute aortic aneurysm began her illness with sudden onset generalized abdominal pain and back pain, vomiting, and loose stool and was admitted to the hospital. After careful analysis of the results of diagnostic tests, the patient was diagnosed with type B aortic dissection with kidney failure. Criteria to manage this patient with type B aortic dissection included reducing blood pressure on the aortic walls, relieving pain, and helping prevent tears from worsening. Nursing care provided for this patient included psychological support, close observation of vital signs and other discomforts to identify the signs of complications, administration of IV morphine infusion for relieving pain with the close observation, administration of medicine, and maintaining intake output of the

patient to reduce blood pressure and prevent worsening of vascular and renal complications. All recommended management was continued but suddenly, the patient became unconscious and had a cardiac arrest. Even though maximal resuscitation efforts were taken, the patient died.

1. INTRODUCTION

Aortic dissection is defined as the disruption of the intima (innermost layer) of the aortic wall which results in dissecting of blood into media and creates a false lumen (Dalman, 2023). Type A has the defect in ascending aorta while type B originates from descending aorta. The blood flows where it usually does not go with a high pressure between layers of the aortic wall, intima and adventitia (Nauta et al., 2016, Lili et al., 2013, Joanna, 2017). Treatments of type A and type B vary from each other. Type B acute aortic dissection is typically diagnosed through clinical evaluation, relying on subjective data and physical examinations (Joanna, 2017). Initially, patients with type B aortic dissection were presented with generalized, severe, sharp or tearing chest or back pain (Lili et al., 2013; Joanna, 2017). Patients with acute chest pain should be suspected to make timely diagnoses and deliver care with appropriate treatments. Moreover, imaging studies increase the identification and early diagnosis of type B aortic dissection (Khabhai, 2013).

The aim of medical treatment of acute aortic dissection type B is to control pain and avoid the extension of the dissection. Sohjoo et al. (2019) emphasized that women are more prone to have acute abdominal aortic dissection. Less than 5% of older women present with nausea, vomiting and coffee-colored diarrhea but, nearly 67% are diagnosed with type B aortic dissection by chest x-rays. Additionally, aortic dissection can be mentioned as a challenging clinical emergency of the human circulation system (Khabhai, 2013). Hence, there are no uniform criteria for managing complicated and non-complicated type B dissection. Typical clinical features of type B dissection are malperfusion of impending organ failure, hypertension, in-hospital shock and renal failure. Nauta et al., (2016) emphasized that elderly patients who were above the age of 70 with type B aortic dissection had the most striking hospital mortality rate of 30%. As mentioned by Huckaby and Leshnower (2023), the greater prevalence of type B dissection are among men. Comparing both genders faster growth of type B dissection are women. Growth rate appears between male and female are 1:2.

The basis of managing this patient with type B aortic dissection included reducing blood pressure, relieving pain, and helping to prevent tears from worsening. Contribution of nursing care for this patient included psychological support, close observation of vital signs and other signs of complications, relieving pain, administration of medicine, and maintaining intake output of the patient to reduce blood pressure and prevent worsening of vascular and renal complications.

2. MATERIALS AND METHODS

2.1 Case History

A 70-year-old woman with a previous history of acute aortic aneurysm experienced the onset of her illness with sudden, widespread abdominal and back pain. Before her admission to the hospital, she also encountered episodes of vomiting and diarrhea. She was admitted to Base Hospital, Homagama. After the examination and history-taking, urgent ultrasound scan was done. The scan noted a hypoechoic layer between the outer and middle third of the tunica media of the aorta suggestive of acute internal bleeding. The medical team was curious about acute bleeding. Immediate actions were taken to transfer the patient from the Base hospital to the National Hospital Sri Lanka (NHSL) as per the consultant vascular surgeon's opinion. Upon the vascular surgeon's assessment, she was subsequently

transferred to the general surgical ward at NHSL.

2.2 Assessment of the Patient

Upon admission, her vital signs were as follows: blood pressure 230/90 mmHg, heart rate 92 min, respiratory rate 16min and body temperature 36.6^{0}C. She has a history of hypertension, diabetes mellitus, non-ST elevated myocardial infarction (NSTEMI) and abdominal aortic aneurism with ongoing treatments. During the physical examination, the abdomen was tender. The patient complained of worsening abdominal and back pain. Multiple episodes of vomiting and loose stools for two days and coffee-colored stools were observed. Peripheral pulsation was felt in the hands but not in the legs. She complained of generalized body weakness. Routine laboratory investigations of blood and urine were done, and her blood report found a rise in serum creatinine level, 10.8mg/dl which indicated kidney disease. Analysis of arterial blood gas evidenced metabolic acidosis. For further confirmation, an X-ray was done and an extended dissection of the aorta could be identified.

In the second day of her admission, she underwent magnetic resonance imaging (MRI) scan. During these periods she had dyspepsia, numbness of both legs and severe abdominal pain. It indicated an intimal flap in the distal aortic arch and descending aorta. Analyzing all those reports the patient was diagnosed as type B abdominal aortic dissection complicated with acute renal failure.

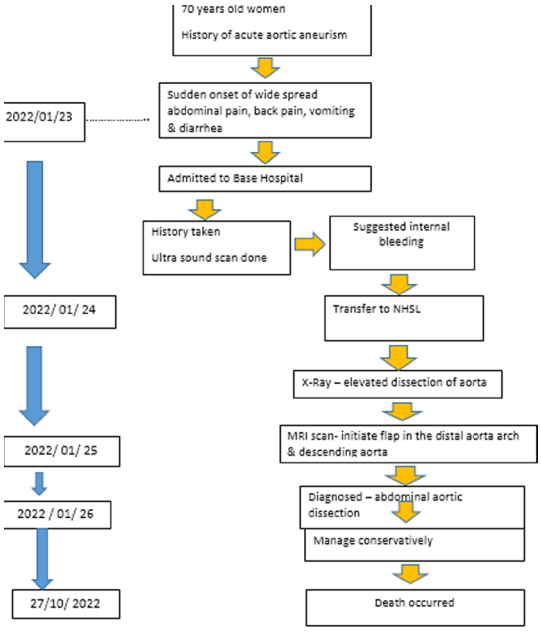
2.3 Management and Nursing Care of the Patient

Treatment commenced to lower blood pressure, alleviate pain, and enhance renal function. Continuous monitoring of vital signs and intake output was performed, and documented. Dialysis was planned as a treatment for kidney disease. The patient underwent conservative management.

Hence, she received parenteral nutrition as prescribed by the nutritionist, alongside the provision of psychological support during nursing interventions, which included drug administration and observation. For pain management, she was given IV morphine infusion with close observation. Oral fluids of 30cc per hour was given and maintained intake output chart and could maintained around 25-30cc urine output hourly. For psychological support, she was permitted to have her immediate family members with her during her hospital stay. Additionally, the relatives were reassured about the condition of their loved one.

In the early morning of the fifth day in the hospital, she experienced a sudden loss of consciousness, leading the medical team to discover that she had gone into cardiac arrest. Despite exhaustive resuscitation efforts, the patient did not survive.

Figure 01



3. RESULTS AND DISCUSSION

Aortic dissection is presented when a disruption of intima (inner layer) of aortic wall and letting the blood into media (middle layer). Due to blood flowing in where it usually does not go leads to a leak of blood with high pressure into the media. It separates into two layers and creates a false lumen

(Fattori, 2016). As mentioned by Li et al. (2013), factors influencing abdominal aortic dissection are hypertension, diabetes, atherosclerosis and increased age. Blood flowing through the false lumen may cause serious outcomes such as renal failure, internal bleeding, limb ischemia and even death. Type B aortic dissection is a rarely presented disease as well as a disease with a high mortality rate in hospitals (Yuan et al., 2020). Managing a type B aortic dissection with complications is a challenging task. Hence, there is no uniform criteria to managing complicating and uncomplicating type B abdominal aortic dissection.

Physical findings of current study were sudden onset chest and back pain, hypertension, vomiting and loose stool. According to Chen et al. (2013) the most common physical findings in a patient with this condition were abrupt onset of chest and back pain and hypertension. Similarly, acute symptoms of type B aortic dissection includes sudden onset of chest pain (Nauta et al., 2016). Blood investigations of present study found that increasing level of serum creatinine, 10.8mg/dl which indicated kidney diseases. Analysis of arterial blood gas evidenced metabolic acidosis. For further confirmation, imaging investigations were done. The extended aorta could be seen in a chest x-ray and an ultrasound scan concluded large thrombus in the abdominal aorta. The other identification of abdominal scan was B/L impairment. As mentioned by Khabhai (2013), using imaging diagnostic techniques improved the early diagnosis and management strategies in the care of these patients. Further, clinical presentation, findings of blood and imaging investigations influenced the choosing correct management strategies such as medical, surgical or conservative management.

This study showed successful diagnosis and the treatment regime started. This initial treatment was able to reduce blood pressure by means of keeping the patient under close observation and relieving pain using pain medication and sedation. Similarly, Li et al. (2013) contributed effective treatment by timely diagnosis of the disease condition of the patient. Initial medical treatments included reducing blood pressure, ongoing monitoring and relieving pain should be affected for disease improvement. Similarly, focused initial treatment was used to stabilize blood pressure and control heart rate. Further, this study focused regular assessment schedule to observe mental status, peripheral vascular changes and hemodynamic changes of the patient (Chen et al., 2013).

Current case study patient was a 70-year-old woman with a complication of renal failure. During the hospital stay, she was treated with optimal medical management. Hence, there was no significant improvement seen. As mentioned by Patel et al. (2016), elderly patients having complicated acute type B abdominal aortic dissection showed even more striking mortality. Age greater than 70 was found to be an independent predictor for in-hospital mortality (Nauta et al., 2016). People over the age of 60 have a 30% higher incidence of complicating type B abdominal aortic dissection than those who under age of 60. In the current study, the patient had significant characteristics of a complicated disease such as renal failure, mal-perfusion, and aneurism with type B aortic dissection disease. Typical criteria for complicated diseases are discussed in the study of Patel et al. (2016). Patel et al. (2016) revealed that the study mentioned renal failure, mal-perfusion and pleural effusion were found to be the highest risk predictors of in-hospital mortality. Though the current study patient followed an optimal management regime, she was unable to survive until a weak diagnosis of her disease condition type B abdominal aortic dissection disease. On the fifth day of her admission, sudden death occurred unexpectedly.

4. CONCLUSION

Aortic dissection can be defined as a tear in the innermost layer of the aortic wall (i.e., intima) that results in high-pressure flow of blood between the layers of the aorta, creating a true and false lumen. Considering the location of the aortic dissection, duration since onset of symptoms, severity of symptoms, and etiology are important, as these impact prognosis and management.

Type B abdominal aortic dissection is a rare disease condition with a high in-hospital mortality rate. Elderly patients, aged 70+ years with a history of hypertension and diabetes are more prone to having type B dissection disease. Therefore, nurses should be fully aware of the disease condition and complications to provide nursing care effectively.

REFERENCES

Chen, D., Escher, M. M. Y., Müller-Eschne, M., Kobligk, T. H., David, Bockler, D., Hose R. and Ventikos (2013). A patient specific study of type B aortic dissection: Evaluation of true false lumen blood exchange. *Biomedical Engineering Online* https//doi.org/ 10.1186/1475-925X-12-65.

Fattor, I. R., Cao P., De Rango, P., Czerny, M., Evangelista, A., Nienaber, C., Rousseau, H. and Schepens, M. (2013). Interdisciplinary expert consensus document on management of type B aortic dissection. *J Am Coll Cardiol* , *61*:1661-78 [PubMed] [Google Scholar] DOI: 10.1016/j.jacc.2012.11.072

Gao, J., Cao, H., Hu, G., Wu, Y., Xu, Y., Cui, H., Lu, H.S. and Zheng, L. (2023). The mechanism and therapy of aortic aneurysms. *Sig Transduct Target Ther 8*,55. https://doi.org/10.1038/s41392-023-01325-7

Huckaby, L. V. and Leshnower, B. G. (2023). Sex and gender differences in aortic disease. *Journal of Cardio Nerds USC* https://doi.org/10.15420/usc.2022.39

Khanbai, M., Ghosh, J., Ashleigeh, R. and Baguneid, M. (2013). Type B aortic dissection after standard endovascular repair of abdominal aortic aneurism. *BMJ Case Report*. https//doi.org/10.1136/bcr-2012-007209

Li, L., Zhuang, S., Qui, S., Cui, J., Zhou, J., Zhu, H., Zhang, W., Li, M and Fu, W. (2013). Acute thoracic aortic dissection (Stanford Type B) complicated with acute renal failure. *Journal of Hindawi* https//doi.org/10.1155/2013/693435

Nauta, J. H. F., Trimarchi, S., Arnoud, V., Moll, F. L., Herwaarden, J. A. V., Patel, H. J., Figueroa, C. A., Eagle, K. A. and Froehlich, J. B. (2016). Update in the management of Type B aortic dissection. *Journal of SAGE.* https//doi.org/10.1177/1358863x16642318

Patel, A. Y., Eagle, K. A. and Vaishnava, P. (2014). Acute type B aortic dissection: insights from the International Registry of Acute Aortic Dissection. *Ann Cardiothorac Surg. 3*(4): 368–374. https/doi.org/ 10.3978/j.issn.2225-319X.2014.07.06

Ramanath, V. S., Oh, J. K., Sundt, T. M. and Eagle, K. A. (2009). “Acute aortic syndromes and thoracic aortic aneurysm,” Mayo Clinic Proceedings, 84 (5), 465–481.

Solhjoo, M., Swarup, S. and Makaryus, A. N. (2019). A case of aortic dissection presenting with atypical symptoms and diagnosed with transthoracic echocardiography. *Journal of Hindawi Case Reports in Radiology.* https//doi.org/ 10.1155/2019/6545472

Yuan, X., Cloug, R. E. and Nienaber, C. A. (2020).

Wolford, B. N., Hornsby, W. E., Guo, D., Zhou, W., Lin, M., Farhat, L., McNamara, J., Driscoll, A., Wu, X., Ellen, M., Nortan, E. L., Marthis, M. R., Ganesh, S. K., Douville, N. J., Brummett, C. M., Kitzman, J., Chen, Y. E., Kim, K., Deeb, M. G., Patel, H., Egale, K. A., Milewicz, D. M., Willer, C. J. and Yang, B. (2019). Clinical implications of identifying pathogenic variants in individuals with thoracic aortic dissection. *Circ. Genom. Precis. Med.* 12, DOI: 10.1161/CIRCGEN.118.002476