

CHAPTER 1

INTRODUCTION

1.1. Background

An arteriovenous (AV) shunt is a connection or anastomosis between vein and artery made in a surgical procedure as vascular access indicated for patients with end-stage renal disease (ESRD) that are projected to undergo routine hemodialysis or have undergone initiation of hemodialysis with a central venous catheter. Installation of an AV shunt allows the formation of a pathway with low resistance so that blood can be flowed from arteries to veins without going through capillaries. The presence of an AV shunt will increase the pressure and blood flow to the vein so that the vein can enlarge and undergo epithelialization, therefore the vein will become more adequate for repeated dialysis needle puncture access (Lok, 2020).

The criteria for AV fistula maturation based on NKF KDOQI guidelines are blood flow of at least 600 mL/minute, vein diameter of at least 6 mm, and minimum distance of 6 mm from the skin surface. Fistulas may take four to six weeks to mature and thereafter can be utilized for hemodialysis and inability to meet this goal is defined as the failure to mature (primary failure).

Many preoperative and postoperative parameters influence the success of AV shunt surgery. Currently, few clinical pathways are used to predict the success of access maturation for AV shunt creation, and the impact of the vessel diameter was researched in numerous studies. The arteriovenous fistula success

rate is 74% when the venous diameter is more than 2 mm compared to 29% if the diameter is less than 2 mm (Limanto, 2021).

Unfortunately, AVF maturation failure and AVG thrombosis remain major clinical problems for hemodialysis patients as 20% to 60% of AVFs created fail to mature successfully for dialysis use (Lok, 2020). A prospective cohort study conducted by Hemodialysis Fistula Maturation study in the United States shows that of 602 patients, 28% failed 2 weeks after surgery and 30% failed 6 weeks after surgery (Cheung, 2017). In line with that, the AV shunt surgery failure rate is still above 30% in Indonesia (Hapsari, 2021).

The cause of most early AV shunt failure in general is still unknown, but the quality of the blood vessels is suspected as a factor. Small or stenotic cephalic veins as well as the presence of a partial thrombus and a small or atherosclerotic radial artery are suspected as possible causes of this failure (Nagarik, 2020). Therefore, this research aims to understand the correlation between the postoperative diameter of blood vessels and the success of AV shunt surgery by retrospective descriptive-analytic method.

1.3. Problem formulation

What is the correlation between intraoperative blood vessel diameter and the technical success rate of AV shunt surgery?

1.4. Research Objective

Based on the formulation of the problem described above, the objectives of this study are:

1.4.1. General Objective

The purpose of this study is to learn and determine the Correlation Between Intraoperative Blood Vessel Diameter and Technical Success Rate of AV Shunt Surgery in Dr. Soetomo Hospital Surabaya.

1.4.2. Specific Objective

1. To analyze whether the vein diameter was predictive of successful AV shunt surgery
2. To analyze whether the artery diameter was predictive of successful AV shunt surgery

1.5. Benefits of the Research

1.5.1. Academic Benefits

This research is expected to improve understanding of the correlation between blood vessel diameter and success rate of AV shunt surgery.

1.5.2. Practical Benefits

This research is expected to provide an overview of how measurement of intraoperative vein and artery diameter can be used as a predictor for AV shunt surgery in ESRD patient who will undergo hemodialysis. Furthermore, this research is expected to gain benefit for ESRD patient to have vascular access with longer patency in the future if blood vessel diameter could be used as predictor of AV shunt surgery success.