10.3 Fibroid Embolization: Anatomy and Technical Considerations

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10.3.1 Introduction

The anatomy of uterine fibroids and uterine artery embolization (UAE) consists of the fibroids, their position in the uterus, and the vasculature associated with the uterus. The vasculature of the ovarian arteries is also important because of the potential for collateral blood flow from the ovarian arteries supplying the fibroids. Communication between the uterine arteries and the ovarian arteries are also important because of the risk of embolization of the ovaries through uterine-ovarian anastomoses.

10.3.2 Anatomy

10.3.2.1 Fibroids

Fibroids are classified by their position in the uterus. Serosal fibroids are found in the outer layer of the uterus and expand outward. They usually do not affect bleeding during the menstrual period, but may cause symptoms due to their size and pressure on other pelvic organs such as the bladder and bowel. Intramural fibroids develop within the substance of the uterus. They enlarge the uterus and can cause both bleeding and pressure symptoms. Submucosal fibroids involve the inner layer of the uterus, and cause the most problems with heavy and prolonged periods and sometimes gushing bleeding also described as flooding. Submucosal and serosal fibroids may be pedunculated, protruding from the uterine wall, sometimes with long stalks.

The size, position, and number of fibroids in the uterus have a bearing on the success of the embolization procedure. The vascular anatomy also has a major impact on the success and complications of the embolization procedure.

10.3.3 Vascular Anatomy and Variants

10.3.3.1 Uterine Arteries

The uterine blood supply is primarily from the uterine arteries. The uterine arteries arise as branches of the internal iliac (hypogastric) arteries. In most cases, the internal iliac artery divides into a posterior division that gives off the iliolumbar, the lateral sacral and the superior gluteal arteries and an anterior division that gives rise to parietal branches (the obturator, inferior gluteal and internal puden-
eral arteries) and visceral branches (the superior vesical, middle hemorrhoidal, uterine and vaginal arteries) [1]. However, the anatomy is variable and variant vascular patterns occur in about 10%–15% of the population [2]. When the arterial anatomy is studied angiographically, the divisions can be into three branches in 14%, four or more in 3% and one main branch in 4% [3]. The anterior division is particularly variable in terms of its branching pattern.

The uterine artery arises from the anterior division of the internal iliac artery usually close to, or in common with the middle hemorrhoidal or vaginal artery. There are several configurations for the origin of the uterine artery. It can be the first branch of the inferior gluteal artery (Fig. 10.3.1a); a second or third branch of the inferior gluteal artery (Fig. 10.3.1b); a trifurcation of the uterine artery, inferior gluteal artery, and superior gluteal artery (Fig. 10.3.1c); or the first branch of the hypogastric artery (Fig. 10.3.1d) [4]. The most common variants are for the uterine artery to be the first branch of the inferior gluteal, or for it to arise from the trifurcation of the uterine artery, inferior gluteal artery and superior gluteal artery [4]. In some cases no uterine artery is identified.

The uterine artery has a very characteristic U-shaped configuration, with a parietal or descending segment running downward and medially, then

![Fig. 10.3.1. a Most common configuration (45%). The uterine artery is the first branch of the inferior gluteal. b An uncommon variant (6%) the uterine artery is a second or third branch of the inferior gluteal artery. c The second most common configuration (43%). There is a trifurcation of the superior gluteal, inferior gluteal and uterine artery. d Another uncommon configuration (6%). The uterine artery is the first branch of the internal iliac, proximal to superior gluteal and inferior gluteal.](image-url)