INTRODUCTION

Coronary Arteries of the Heart

Left Coronary Artery

Circumflex Artery

Left Anterior Descending Artery

Right Coronary Artery

Acute Marginal Artery

Posterior Descending Artery
INTRODUCTION

Coronary artery disease (CAD) is a major cause of human mortality and morbidity. It has become the focus of medical & general interest to an extent which no one has foreseen as recently as a generation ago. Along with various etiological factors anatomical variation is also responsible for coronary artery disease. Recent advances in the field of cardiology and cardiac surgery for further management of CAD gave a new significance to the study of normal anatomy, variations and anomalies of coronary arteries.

Heart is one of the vital organs and its blood supply is by coronary circulation. The heart is the earliest organ to start functioning morphologically and developmentally. It is a modified organ contracting rhythmically and keeping it functioning smoothly which entirely depends on coronary arterial blood supply. The normal coronary artery distribution is well known and can be examined in a wide spectrum, as no two anatomical patterns are exactly alike. Coronary artery anomalies are present at birth and represent remarkable changes from the normal structure. The coronary artery are the first and among the smallest in caliber of the vessels arising directly from aorta. From the point of clinical importance, the knowledge of coronary artery anomalies is useful for the better evaluation of the problems and possible early treatment of diseases like angina pectoris and myocardial infarction.
The coronary arteries may have several anomalies in terms of both number and position. History of the coronary artery starts with the name of “Galen” as he was the first, who defined the artery of the heart and named it as coronary artery. The existence of anastomosis, variation of divisions, course and distribution of the coronary arteries and their branches has been a controversial subject for many decades. With increasing interest in the knowledge of the clinical and pathological picture of coronary artery diseases, the normal anatomical distribution and variations of the coronary arteries are assuming greater significance.

Although much investigation has been done on various cardio-vascular disorders but still there is some controversy about the coronary arteries as the end arteries. It has been pointed out by various investigators that the collateral circulation is poorly developed in human hearts, so these vessels are said to behave like end arteries. Gregg (1980) stated that “In the field of circulation have our views changed more frequently than in the interpretation of the coronary circulation.” Right from the time of Harvey’s discovery of circulation, the diseases of the heart were diagnosed on basis of clinical and experimental observation, but with the development of open heart surgery and coronary angiography, it has made possible for the precise visualization of coronary arterial pattern, caliber and its variation of division.

Coronary artery disease is a major cause of human mortality and morbidity and is one of the major causes of death in developing countries. It is also established that the incidence of coronary artery disease is much higher in men than in women until the
fourth fifth decades of life then it increases more steeply in women than in men (Kalin and Zumoff, 1990). It has been speculated that the protective factor may be the female hormone estrogen which favorably affects lipid metabolism slowing down the process of atherosclerosis in coronary arteries (Walsh et al, 1991). It is well known that blood flow through arteries is influenced by various mechanical and hydraulic factors (Braunwald, 1992). More progress has been made in the last few decades than in all foregoing medical history in the management of cardiovascular diseases. In the past Gross et al (1934) studied histology of coronary arteries and their branches in human hearts. Henry (1957) studied coronary arteries in human fetuses, infants and juveniles. The arteries undergo progressive and gradual changes from birth to death and it is difficult to say where the normal growth processes end and the processes of evolution begin. Jose and Clove (2001) studied origin and distribution of coronary arteries in normal mice.

The increasing use of diagnostic and therapeutic interventional procedures necessitates that astound basic knowledge of the coronary artery pattern. With this aim the normal patterns of coronary arteries is studied with reference to the predominance, branching patterns and variations.

More progress has been made in the last few decades than in all foregoing medical history in the management of cardio-vascular diseases. One uncorrectable lesion after another has nowadays become amenable to correction, as more new surgical and interventional techniques are being introduced.
Knowledge of the normal and variant anatomy and anomalies of coronary circulation is an increasingly vital component in the management of congenital and acquired heart diseases. Congenital, inflammatory, metabolic and degenerative diseases may involve the coronary circulation and increasingly complex cardiac surgical repairs demand enhanced understanding of the basic anatomy to improve the operative outcomes.

Most coronary artery anomalies are discovered accidentally during coronary angiography or autopsy; however, most anomalies are not symptomatic due to the absence of functional importance. Nevertheless diagnosis and understanding of anomalies in coronary circulation are important in considering the severity of coronary artery stenosis in regard to therapeutic maneuvers such as by-pass surgery and angioplasty. As coronary angiography is routinely used to evaluate coronary morphology for diagnostic and treatment purposes, it is important to be aware of these anatomical variants. There have been many studies about the angiographic, clinical and haemodynamic consequences of these anomalies.

Variations in coronary anatomy are often recognized in association with structural forms of congenital heart disease. Importantly coronary artery anomalies are a cause of sudden death in young athletes. Understanding the pathophysiology is important in guiding management because variations in coronary anatomy are common. Because of considerable heterogeneity of coronary vasculature, what is considered atypical, abnormal, aberrant, anomalous, accessory, ectopic, incidental, variant, or significant is often unclear. The incidence of congenital coronary artery anomalies is 5-6 %
(Mongiardo, 1991). By definition, the term anomalous or abnormal is used to define any variant form observed in less than 1% of the general population (Bekedam & Vligen, 1999). The recent introduction of selective coronary arteriography that provides an accurate localization of the anatomical variations and underlying pathology. The advances made in coronary arterial bypass surgeries and modern methods of myocardial revascularization makes it imperative that a thorough, sound and complete knowledge of the normal and variant anatomy of coronary artery and circulation is required, which led to this study.

New image-based diagnostic techniques have led to greater reliability in the identification of these anomalies, an in-depth knowledge of the normal anatomy of coronary arteries and their variations being required (Frommelt et al., 2001; McConnell et al., 1995; Post et al., 1995; Ropers et al., 2001). The incidence of all coronary anomalies is 0.23% in autopsy series (Alexander and Griffith, 1956) and ranges between 0.3% and 12% in angiographic series (Chaitman et al., 1976; Engel et al., 1975; Barriales et al., 2001). Owing to their relatively high rate of prevalence, some of these anomalies may be considered as variations within normal limits, taking the 1% presentation criteria as the limit between variations and anomalies (Levin, 1983; Angelini, 1989) and have already been described (Reig, 2003). Here, variations with prevalence in the general population of less than 1%, and which are therefore considered as coronary anomalies, are described. In many cases, their presence affects or may affect the subject’s quality of life and even their survival (Angelini et al., 1999; Basso et al., 2001).
The present work was undertaken to study the coronary arterial pattern in human hearts for knowing the variation of division, course and distribution of coronary arteries and their branches. Also in present work which artery commonly involved in CAD and risk factors of CAD studied. It was studied by coronary angiography, special radiological procedure and dissection methods.