February 14, 2020

Treatment of Coronary Artery Disease using Arteriography alone can result in the introduction of treatment errors.

Richard Fleming, PhD, MD, JD; Matthew R Fleming, BS, NRP | FHHI-OI-Camelot; Eastern Virginia Medical School Tapan K Chaudhuri, MD (EVMS)

The decision to treat coronary artery disease (CAD) using PCI, CABG or medical management in many instances is fundamentally determined by the qualitative interpretation of the extent and severity of coronary artery lumen disease [1] present in a given patient.

As previously established, this qualitative interpretation from coronary arteriography results in the over estimation of narrowing of the coronary lumen, when greater than 50%DS is present and the under estimation of the extent of coronary lumen narrowing when less than 50%DS is present [2]. The consequences of this approach results in a biased decision making process yielding less than desired results [2].

The fundamental understanding that CAD is an inflammatory process which builds up in the walls (tissue) of the coronary arteries impairing coronary blood flow long before lumen narrowing occurs demonstrates another concern when treatment decisions are based solely upon anatomic changes within the coronary lumen [3-5].

The trends in characteristics and outcomes discussed [6] reveal the continued misunderstanding of the fundamental pathophysiology of inflammatory CAD, and the failure to quantitatively measure the impact of that inflammatory process [7], thus resulting in continued treatment errors - increasing medical costs without demonstrable improvements in outcomes.

## References:

- 1. Fleming RM. Coronary Artery Disease is More than Just Coronary Lumen Disease. Amer J Card 2001;88:599-600.
- 2. Fleming RM, Kirkeeide RL, Smalling RW, Gould KL. Patterns in Visual Interpretation of Coronary Arteriograms as Detected by Quantitative Coronary Arteriography. J Am Coll. Cardiol. 1991;18:945-951.
- 3. Fleming RM. Chapter 29. Atherosclerosis: Understanding the relationship between coronary artery disease and stenosis flow reserve. Textbook of Angiology. John C. Chang Editor, Springer-Verlag, New York, NY. 1999. pp. 381-387.
- 4. Fleming RM. Chapter 64. The Pathogenesis of Vascular Disease. Textbook of Angiology. John C. Chang Editor, Springer-Verlag New York, NY. 1999, pp. 787-798.
- 5. Glagov S, Weisenberg E, Zarins CK, et al. Compensatory Enlargement of Human Atherosclerotic Coronary Arteries. N Engl J Med 1987;316:1371-1375.
- 6. Alkhouli M, Alqahtani F, Kalra A, et al. Trends in Characteristics and Outcomes of Patients Undergoing Coronary Revascularization in the United States, 2003-2016. JAMA Netw Open 2020;3(2):e1921326.
- 7. Fleming RM, Fleming MR, Dooley WC, Chaudhuri TK. Invited Editorial. The Importance of Differentiating Between Qualitative, Semi-Quantitative and Quantitative Imaging Close Only Counts in Horseshoes. Eur J Nucl Med Mol Imaging. DOI:10.1007/s00259-019-04668-y. Published online 17 January 2020 https://link.springer.com/article/10.1007/s00259-019-04668-y