Introduction : Disruption or erosion of vulnerable atherosclerotic plaques are the most frequent cause of ACS. In vivo detection of potentially vulnerable plaques may improve prevention of cardiovascular events. IVUS provides a more comprehensive assessment of the atherosclerotic plaques. In addition, it had been used extensively for assessment of anatomical significance of intermediate coronary lesions.

Aim of work : To study the morphology and severity of angiographically intermediate coronary lesions in patients with acute coronary syndromes.

Methodology: Twenty eight patients with the diagnosis of Non ST Elevation Acute Coronary Syndromes. Coronary Angiography showed intermediate lesions assessed by QCA and IVUS. Percent area stenosis $\geq$ 70%, MLA adjusted to the reference vessel diameter & MLA $\leq$ 6mm^2 for left main artery were the criteria for intervention. Three to six months clinical follow up regarding MACE and six months mortality.

Results : Mean age was 53.2 ± 9.1 years. Males=20 (71.4%). Smoking in 17 (60.7%), hypertension in 16 (57.1%), Dyslipidemia in 12 (42.9%) & DM in 8 (28.6%). Mean BMI=23.4 ± 2.9. Twenty three patients diagnosed as UA and five patients diagnosed as NSTEMI. Mean TIMI risk score 3.1±1.4. A statistically significant higher TIMI risk score in NSTEMI group (P=0.02). Multi-vessel disease in 17 patients (60.8%). Seventy six vessels were affected with 23 Culprit vessels, 44 non-culprit vessels & 9 left main vessels. Mean syntax score 17.5 ± 8.0. sixty one intermediate lesions were detected with higher fibrofatty structure. Negative remodeling in 51% of lesions. 29 lesions in culprit vessels & 32 lesions in non-culprit vessels with higher lipidic content in lesions of culprit vessels (P<0.001) while there was a higher calcific content in lesions of non-culprit vessels (P<0.001). 27 lesions were subjected to revascularization based on IVUS measures. QCA Minimum lumen diameter was significantly lower (P=0.002) and percent diameter stenosis was significantly higher in revascularization group (P=0.02). MLA was significantly lower (P<0.001) and Percent area stenosis was significantly higher in revascularization group (P<0.001). MLA & plaque burden are the main predictors for lesion anatomical significance with (P <0.001, OR=0.25, 95% CI = 0.12-0.55) and (P=0.011 , OR=2.0 , 95% CI = 1.2-3.3) respectively. A significant positive strong correlation between QCA minimal lumen diameter and minimum lumen diameter measured by IVUS at the site of lesion (P<0.001, r=0.704). A significant positive strong correlation between QCA minimal lumen diameter and MLA measured by IVUS (P<0.001, r=0.695). A significant inverse moderate correlation between QCA minimal lumen diameter and percent area stenosis measured by IVUS (P<0.001, r=-0.449). A significant positive weak correlation between QCA percent stenosis and percent area stenosis measured by IVUS (P=0.021, r=0.295). A significant concordance between QCA & IVUS regarding percent stenosis (P-value=0.01,ICC=0.451,95%CI=0.084-0.67). A significant positive moderate correlation between QCA reference diameter and proximal reference maximum vessel diameter (P=0.013, r=0.358). Disconcordance between QCA & IVUS regarding measurement of the lesion length (P=0.2,ICC=0.22,95%CI=-0.3 -0.53). Complications occurred in 9 patients (32.2%). One patient (3.6%) with MACE & six month mortality.

Conclusion: IVUS is helpful in planning the management of intermediate lesions. Intermediate lesions in culprit vessels showed high lipidic content indicating high vulnerability for plaque rupture. MLA & plaque burden are the main predictors for lesion anatomical significance. QCA is a reliable tool for detecting severity of coronary artery disease. Low complication rate and MACE related to the use of IVUS .

Key words: ACS: Acute coronary syndrome, Intermediate lesions , QCA: Quantitative coronary angiography , IVUS: Intravascular ultrasound , MACE: major adverse cardiac events , MLA: Minimal lumen area , vulnerable plaques , UA: unstable angina, NSTEMI: non ST elevation MI.