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Transradial Diagnosis and Intervention of Supra Aortic Arterial Vessels

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Background: Transradial approach (TRA) is becoming widely spread mainly for coronary interventions but it has been rarely used for diagnosis and even less for therapeutic supraaortic (SA) arterial vessel pathologies.
Aim: To report our experience in both diagnostic and therapeutic endovascular procedures for SA arterial vessels by using the TRA.
Methods: During the last year 20 diagnostic and 15 therapeutic procedures for SA vessel were undertaken using the TRA. Twenty six M, 9F with a mean age of 65±7 years were included. The indications for diagnostic or therapeutic procedures were: clinical findings and symptoms related to SA vessels. The indications for TRA were: no option of femoral approach (9/35), hostile arch anatomy (3/35),technical failure via femoral approach (2/35),ostial vertebral disease (5/35), Pts preference(16/35). All diagnostic procedures were undertaken using 5F catheters. Vessels treated were: Carotid, Vertebral, Subclavian and Braciocephalic arteries. Vessels involved and equipment used are described: G-guiding catheter, D-diameter, Ex-expandable.

Vessel	Number of patients	Guiding size	Guiding wire	Types of stents	Stent D mm
Carotid	5	6F	.035''	Self-Ex	6-8
Vertebral segment	V1-5, V2-3, V4-3	5F	.014''	Coronary stents	2.5-4
Brachiocephalic	1	6F	.018''	Balloon-Ex	7
Subclavian	3	6F	.014''- .018''	Balloon-Ex	7-8

Technical success was achieved in 14/15 therapeutic procedures. We switched to femoral approach in one pts with right sided carotid disease where distal protection device couldn't be propagated distal to the narrowed segment .In all procedures neither vascular nor neurological complications were recorded.
Conclusions: Diagnostic and therapeutic procedures involving the SA arterial vessel can be safely and successfully preformed via the TRA by experienced cardiology team

The Incidence of Cerebrovascular Events Following Cardiac Catheterization

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Background: Catheterization related acute cerebrovascular events (CVEs) are one of the most feared complications in the catheterization laboratory. We aimed to assess the real-life incidence, etiology, and risk factors of this complication.

Methods: All patients undergoing cardiac catheterization in our center are prospectively registered in a database, recording patient and procedural characteristics and in-hospital progress. A retrospective analysis assessing acute CVEs (transient ischemic attack- TIA, ischemic stroke- IS or intracerebral hemorrhage- ICH), in this population over 20 years was performed. CVEs occurring within 24 hours from procedure commencement were included. CT confirmation was obtained in all cases.

Results: 42,286 cardiac catheterizations were performed in 29,781 patients of which 12,437 (29.4%) were combined diagnostic and interventional studies (PCI). 47 CVEs (0.11 %) were reported. Of these, 38 patients suffered IS, six had TIAs and three ICH. IS were predominantly to the anterior circulation (27; right hemispheric 14, left hemispheric 13), while only 11 involved the posterior circulation. Three patients died during hospitalization: one with left occipital intracerebral and subarachnoid bleeding and two with massive posterior circulation infarction. 33/49 (67.3%) of the CVEs were patients undergoing PCI, such that the stroke risk for a diagnostic catheterization was 0.054% (16/29849) and 4 times greater for patients undergoing PCI (0.27%, 33/12437). The age range was 46-89 (median 72) years, 32/49 (65.3%) were males, with almost all patients having significant risk factors for coronary and cerebrovascular disease (hypertension 90%, hyperlipidemia 68%, diabetes 50% and smokers 27%).

Conclusions: CVEs following diagnostic cardiac catheterization are extremely rare but 4 fold higher following coronary interventions. The incidence of intracranial bleeding is negligible.

Six-Month Clinical Outcomes of Patients Deferred from Angioplasty Based on Fractional Flow Reserve

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Background: Fractional flow reserve (FFR) has become the gold standard in physiologic assessment of coronary artery stenosis. A FFR value ≥0.75 is considered a reliable physiologic parameter indicating a functionally non-significant lesion.
Objective: To evaluate the clinical outcomes of "real world" patients deferred from angioplasty based on FFR measurements and clinical judgment.
Methods: The FFR measurement was performed in 182 patients (200 vessels) that were referred to the catheterization laboratory for evaluation of coronary artery disease and had an intermediate grade stenosis in their angiograms. Mean age was 63±11 yrs and 80% were males. Patient's risk factors for ischemic heart disease were: diabetes in 43%, hypertension in 67% and dyslipidemia in 88%. The clinical presentation was stable angina in 39% and acute coronary syndrome (excluding those with myocardial infarction <5days) in 47%. The angiographic findings revealed multivessel disease in 51%. The culprit lesions were in the LM in 3%, in the LAD in 59%, in the CX in 21% and in the RCA in 17%. Mean % diameter stenosis was 59±14 with a mean FFR value of 0.85±0.09.
Results: Based on FFR measurements and clinical judgment, patients were treated by angioplasty with stent deployment in 34% of the cases (mean FFR=078±0.1 at baseline, increased to 0.92±0.05 post angioplasty) and by conservative medical treatment (mean FFR=0.88±0.06) in 66%. Six-month follow-up of all the patients included in this cohort revealed MACE=4.4% in the patients treated conservatively compared to MACE=1.9% in the patients treated by angioplasty (p=0.8).
Conclusion: In "real world" patients with intermediate grade coronary lesions, the defer of angioplasty based on FFR measurement combined with clinical judgment seems to be a viable strategy with good six-month clinical outcomes.

Renal Function after Transcatheter Aortic Valve Implantation: Better than Expected

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Background: Patients with severe symptomatic aortic stenosis (AS) have lately been treated by Transcatheter Aortic Valve Implantation (TAVI). These patients are often elderly with multiple co-morbidities including renal dysfunction. Worsening renal function after TAVI has been reported, with a small proportion of the patients needing hemodialysis. In 2011 the Valve Academic Research Consortium (VARC) published its definitions for Acute Kidney Injury (AKI) after TAVI. We report the renal consequences of patients undergoing TAVI at our institution.

Methods and Results: Eighty-two consecutive TAVI patients were included in this analysis. Demographic, clinical, procedure-related and post-procedural variables were assessed. Mean age was 80.9 ±6.3, Logistic Euroscore was 23 ±14.9, Mean creatinine level at baseline was 99 ±31.9 µm/ml and mean GFR was 52.8±18.7 mL/min. According to VARC definitions 12 patients (14.6 %) experienced mild AKI (stage 1) and only one patient (1.2%) had moderate AKI (stage 2) which was secondary to cardiac tamponade and resolved after pericardiocentesis. There were 3 in-hospital deaths none of whom had AKI after TAVI, most patients with AKI returned to their baseline kidney function before discharge. Baseline characteristics associated with AKI were lower GFR and a prior history of HTN but these did not reach statistical significance. Significant bleeding (at least 3 g/dl) was associated with an increased occurrence of stage 1 AKI. Excessive hypertension after TAVI was not associated with a higher incidence of AKI.

Discussion: TAVI patients are much older than the usual cathlab patients and suffer from multiple co-morbidities. However, renal failure following TAVI is not prevalent and when it occurs it is usually mild and transient. Special attention should be given to pre- and peri-procedural hydration, prudent use of contrast media during the procedure, avoidance of blood loss and intensive post procedural hemodynamic monitoring.

Predictors for Development of Significant CAD in Patients with Previously Normal Coronary Arteries

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Background and Aim: Little is known about the risk of developing significant coronary artery disease (CAD) in pts with previously demonstrated normal (NCA) or near normal coronary arteries (NNCA), and the factors influencing this risk. Therefore in the current study we tried to identify the predictors of development of significant CAD.
Methods: We searched our database of coronary angiograms performed from January 1992 to November 2009. We identified patients who underwent repeat coronary angiography after NCA or NNCA on first coronary angiogram. The contribution of risk factors for CAD, the indication for angiography and ECG-changes to the risk of developing significant CAD was examined.
Results: During the research period 29350 coronary angiograms were performed in our institution. Of the 241 patients who underwent repeat angiography after having NNCA (57 – 24%) or NCA (184 – 76%) at the 1st procedure, 173 pts (72%) had no change in coronary anatomy on repeat angiogram. 68 (28%) patients developed significant CAD on 2nd angiogram, 25 (44%) with NNCA vs. 43(23%) with NCA on 1st angiogram, OR=2.3 (95% confidence interval, 1.2-4.5, p=0.016). The mean time difference between the 1st and 2nd angiogram was 5.3±3yrs. Pts with NNCA on the 1st angiogram underwent repeat angiogram after a mean of 3.9±3yrs, pts with NCA after a mean of 5.6±3yrs (p=0.001). Of the pts with significant CAD on the 2nd angiogram, 28 (41%) had ST-deviation, i.e. depression, elevation or both (p<0.001) and 46% T-wave inversion (p=0.001) on ECG. Evidence of myocardial infarction was apparent for 18 (58%) pts with significant CAD (p<0.0001). Presence of two or more CAD risk factors were associated with increased risk for CAD on 2nd angiogram, HR=2.28 (95% CI 1.27-4.10, p=0.006).
Conclusions: The majority of pts with previously NCA will still have normal coronaries on a 2nd angiogram. The presence of 2 or more CAD risk factors, NNCA on the 1st angiogram, ischemic ECG changes, evidence of myocardial infarction are independent predictors for the development of significant CAD.

DES Benefit in High Risk Subpopulations - A Comprehensive Analysis of a Large All-Comer PCI Database

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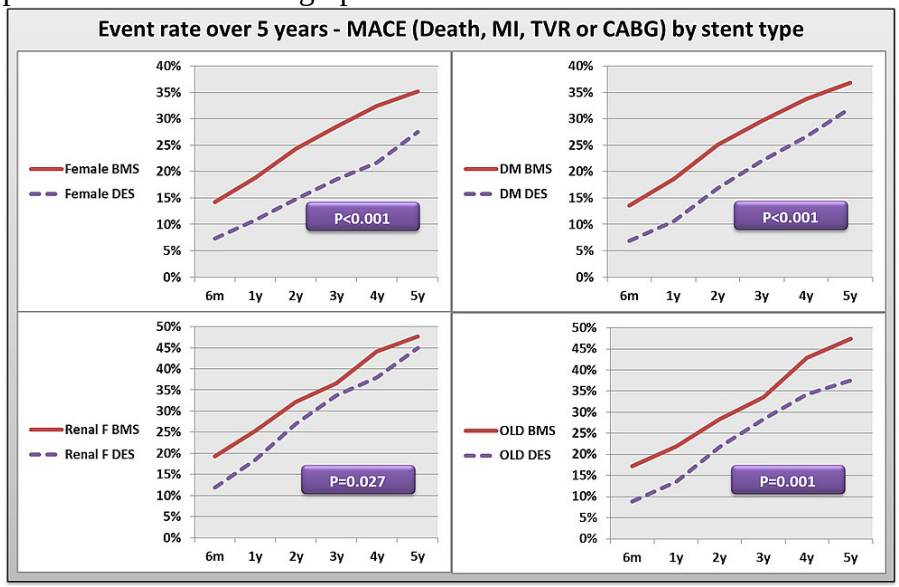
DES use has been shown to be safe and effective in reducing MACE in patients undergoing PCI. Higher risk patients such as females, diabetic, renal failure patients and octogenarians, may or may not benefit from the use of DES. We therefore examined the effect of DES use in these various subpopulations.

We analyzed 8592 consecutive PCI cases from 4/2004 to 12/2010 and determined rates of death, death or MI and MACE (Death, MI, or revascularization-TVR/CABG) with a median follow up of 4 years (6m to 7y). Analysis of DES vs. BMS in the subgroups was done on a propensity score-matched cohort of 6869 patients. Subgroups were female (24%), diabetics (41%), renal failure patients (16%), and octogenarians (17%).

At 1 year, females had a higher risk of death (7.69% vs. 4.77%) and MACE (15.97% vs. 12.59%). Similar were diabetics (death 6.75% vs. 4.57%; MACE 16.37% vs. 11.31%), renal failure patients (death 15.81% vs. 3.44%; MACE 24.93% vs. 11.14%) and octogenarians (death 9.85% vs. 4.54%; MACE 18.37% vs. 12.35%).

Use of DES provided a significant and sustained benefit in all subgroups over a 5-year follow up period as shown in the graph:



In conclusion, high risk patients derive a sustained and significant benefit from the use of Drug Eluting Stents.

Increased Incidence of Coronary Artery Origin Anomalies Associated with Patent Ductus Arteriosus

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Background: Coronary artery anomalies may increase the risk of sudden death. While we are aware of an association between coronary artery anomalies and certain congenital heart anomalies such as tetralogy of Fallot and transposition of the great arteries, it is thought to be infrequently associated with isolated patent ductus arteriosus (PDA). We report our experience of coronary anomalies in PDA patients.

Methods and Results: We reviewed 198 angiograms of PDA patients performed between 1999-2011, in order to determine the origin of the coronary arteries. In 100 angiograms (51%) the origin of the coronary arteries could be adequately visualized. An anomalous origin of coronary arteries was detected in 11/100 patients (11%). Seven had a single common coronary origin (7%). One had an aberrant origin of the left coronary artery from the non-coronary sinus and three had an aberrant origin of the right coronary artery; two from the left coronary sinus and another from the non coronary sinus.

Conclusions: These findings suggest that the incidence of coronary artery anomalies in association with an isolated PDA may be considerably higher than were previously reported. In view of the increased risk of sudden death with coronary anomalies, a reasonable approach would be to determine the coronary artery origin and pathway following the diagnosis of an isolated PDA.

Variations in the Risk of Contrast-Induced Nephropathy Post Percutaneous Coronary Intervention

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Background: Several definitions have been used to assess rates of contrast-induced nephropathy (CIN) in patients undergoing PCI. Whether the definition influences observed rates of CIN is unclear.
Aim: The Oxilan Registry was a prospective analysis of the efficacy and safety of ioxilan (low-osmolar and low-viscosity contrast medium), including rates of CIN assessed by multiple definitions, post PCI.
Methods: 400 consecutive patients undergoing PCI using ioxilan were enrolled. Serum creatinine (SCr) and estimated glomerular filtration rate (eGFR) were assessed at baseline and 3 to 5 days after PCI. CIN was defined by 1 of 4 definitions: (1) absolute increase in SCr ≥ 0.5 mg/dl over baseline, (2) relative decrease in eGFR ≥25% from baseline, (3) relative increase in SCr ≥25% over baseline, and (4) a composite of the preceding 3 definitions. Furthermore, patients with CIN were subdivided into 3 categories based upon whether their baseline and 3-5 day follow-up SCr was normal or abnormal: 1) normal (baseline)-to-normal (follow-up), 2) normal-to-abnormal, and 3) abnormal-to-abnormal.
Results: CIN rates were 3.3% (SCr increase ≥0.5 mg/dl), 7.6% (eGFR decrease ≥25%), 10.2% (SCr increase ≥25%), and 10.5% (composite). According to changes in SCr, for patients who developed CIN defined as a rise in SCr U>U0.5 mg/dL, none (0%) were in the normal-to-normal category. In contrast, 43% of patients with CIN defined as a U>U25% decrease in eGFR and 50% of the patients defined as a U>U25% increase in SCr were in the normal-to-normal category. Hospitalization was prolonged in 3.4% of patients with CIN and none required dialysis.
Conclusions: In this unselected population undergoing PCI, CIN ranged in frequency from 3.3% to 10.5% depending on the definition used and was not associated with in-hospital mortality or substantial morbidity. The wide variation in CIN and its lack of association with adverse outcomes underscore the need for a standardized, clinically relevant definition.

Single Center Experience With Trans-Radial Approach for Primary PCI

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Background: About 90% of the procedures in our Cath Lab are done as trans-radial approach. For several years we have extended this technique to primary PCI (PCI/TRA).
Methods: Since January 2007 we adopted the radial approach for all new patients with STEMI referred to primary PCI. Patients with weak radial pulse, severe dysrhythmia, CHF or hypotension were excluded. We used published world data of primary PCI by the trans-femoral approach, as reference for time table, fluoroscopy time and contrast media volume.
Results: 98 STEMI patients, 88 males, 10 females, mean age 58±12 years, underwent primary PCI/TRA as a routine procedure (right radial all). IRA were: LAD: 42, LCX: 15, RCA: 41. Full patency restoration of the IRA was achieved in 100% of the patients. In 32 cases. We used thrombus aspiration devices. In 5 patients a bifurcation PCI with kissing balloon was performed successfully. Ten patients had slow reflow phenomenon resolved after IC Adenosine injection. In 4 cases IABP was inserted through the femoral artery due to low blood pressure and slow reflow. There was no major bleeding, pseudo-aneurysm or fistula. There was no need for blood transfusion. In one case (treated by Integrilin Heparin and Plavix) there was a large hematoma in groin (IABP insertion site) and small one in the forearm. There were 5 more cases with minor hematoma in the forearm. There was no cerebral ischemic event. Time table, fluoroscopy time and contrast media volume were better than the published world data for primary PCI using the femoral approach.
Conclusions: Following a meticulous learning curve, the trans-radial approach can be applied for primary PCI with high success rate, short door to balloon interval, low fluoroscopy time and contrast media volume, and low vascular and bleeding complication rate which increases the safety margin for this procedure that utilize high degree of anti-coagulation/aggregation medications so it can improves long term survival of these patients.