INTERVENTIONAL RADIOLOGY-ADVANCES

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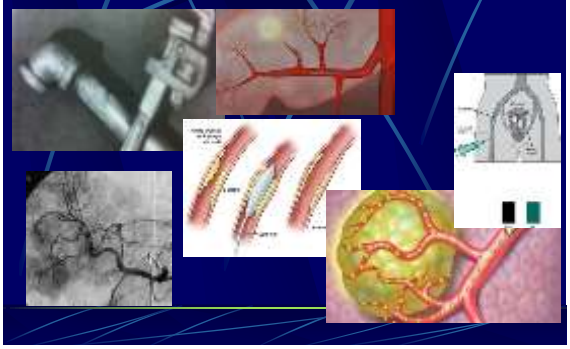
INTERVENTIONAL RADIOLOGY

- Image guided surgery
- Fluroscopy, CT, Ultrasound, MRI
- A subspeciality with significant growth in the last two decades
- "Microinvasive rather than minimally invasive"

IR: HiTech in Medicine

- Microinvasive image guided surgery
- Surgery of the 21st century!
- Innovation-drug coated stents (rabamycin, paclitaxol)
- AAA stent grafts
- Targeted cancer therapy:monoclonal Abs, gene therapy

IR: Technology revolution



EVOLUTION OF INTERVENTIONAL RADIOLGOY

- Charles Dotter-1964 successfully dilated femoropopliteal artery with catheters
- Seldinger technique- a revolution!
- Gruntzig-1979 first ballon angioplasty
- Palmaz-1987 stents
- 1997 stent grafts

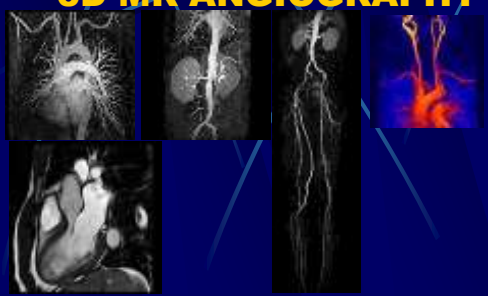
Dotter it!

GOOGLE IT!

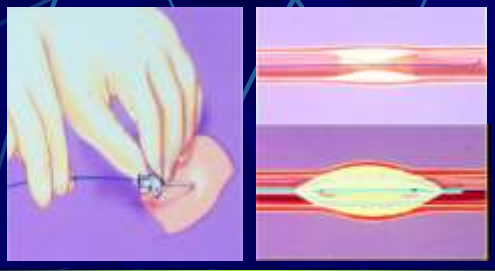
DOTTER'S PROVERBIAL LIGHT, CREATIVITY AND COMPASSION

- 'CATHETER TRAVERSAL' THROUGH AN ILIAC OCCLUSION!
- THIS WAS FOLLOWED BY MANY CASES WHERE HE USED A GUIDEWIRE AND TEFLON CATHETERS TO DILATE STENOSIS

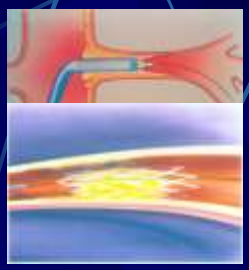
3D MR ANGIOGRAPHY



Seldinger Technique



Stenotic/Occlusive disease: Stents



- Stents have revolutionized treatment of occlusive disease
- Patency rates in primary branches of aorta: 70-80% 1yr;restenosis does occur

IR: Inherent Advantages

- Minimal tissue disruption
- Usually under regional anesthesia
- Minimal blood loss
- Poor surgical risk pts-CAD, COPD
- Decreased post procedural morbidity, decreased hospital LOS
- Significantly shortened recovery times

IR: Blood Conservation

- IR-minimal blood loss <10cc
- Jehovah's witness
- Natural alliance with advance bloodless programs (ABP)
- High risk patients, coagulopathy

Acute Care: Role of Interventional Radiology

- MEDICAL EMERGENCIES
  - Acute massive pulmonary embolism
  - Acute stroke
  - Acute significant bleeding: GI, trauma,post partum, hemoptysis, epistaxis
- Catheter based techniques in the right setting can save a life and/or prevent significant clinical sequalae

PORTAL HYPERTENSION: TIPS

TIPS: POST F/U

Role of IR in Emergency Medicine

- Management of Tension Pneumothorax
- Percutaneous management of acute renovascular ischemic disease, mesenteric vascular disease
- Thrombolytic therapy in acute limb ischemia

Transcatheter Embolization: Materials

- Autologous clot
- Gelfoam pledgets
- PVA
- Embospheres
- Glue
- Coils
- Onyx

Post Surgical Bleeding:Embolization

Acute Care: Role of Interventional Radiology

- MEDICAL URGENCIES
  - IVC Filter placement in prevention of PE
  - Treatment of Acute massive iliofemoral DVT
  - Treatment of embolic/thrombotic peripheral vascular disease: cold foot, occluded graft
  - Acute acalulous cholecystitis, malignant biliary obstruction
  - Acute obstructive nephropathy
  - Percutaneous management of intraabdominal, thoracic and other abscesses
  - Loculated pleural effusions

Acute Care: Role of Interventional Radiology

- Provide Central Venous Access in ICU setting, telemetry-PICCs, Triple lumens, Hohn, Monitoring caths
- ESRD : Temporary and tunelled hemodialysis catheters
- PUS-BUSTERS, CLOTBUSTERS!

Sub-acute Care: Role of Interventional Radiology

- Central Venous Access-mid term, longterm lines: PORTs, Hickmans, Groshongs, Tunelled caths
- Percutaneous CT and Ultrasound guided biopsies
- Management of low back pain-percutaneous vertebroplasty, nerve blocks, facet blocks, epidurals

IR: HITECH DIAGNOSIS Noninvasive

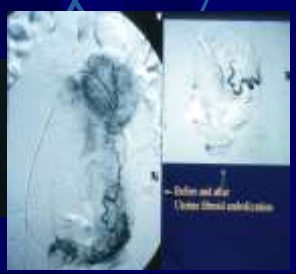
IR: Emerging Role

- Gynecological therapies- Fibroids, pelvic congestion syndrome, fallopian tube recanalization
- AAA repair with stent grafts
- Spine- Vertebroplasty for acute compression fractures

UTERINE FIBROIDS

- SYMPTOMS BASED ON LOCATION IN UTERUS
- BLEEDING,PELVIC PAIN, CRAMPING,MASS EFFECT,DYSURIA & DYSPAREUNIA

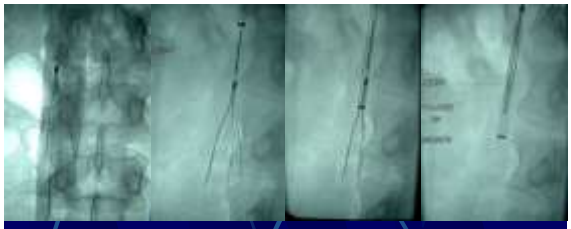
UAE: PRE/POST EMBO



UAE: CLINICAL RESULTS

- Menorrhagia: 92%
- Mass effect: 85%
- Dysmenorrhea: 88%
- Future pregnancy not an absolute contraindication
- Recurrence : <1%
- Infection: 1-2%
- Ovarian failure:1-4%

DVT: cath directed lysis



Temporary IVC filter

- Jugular or Femoral approach for placement
- FDA approved (permanent or up to two weeks for removal)
- Must be removed from jugular approach

Venous Hypertension

- Valves damaged
- Fibrointimal changes
- Varicosities, ulcers, hyperpigmentation, swelling, phlegmasia

Ambulatory Venous Hypertension

Osteoporotic Compression Fractures

Percutaneous Kyphoplasty

Compression Fracture: Vertebroplasty

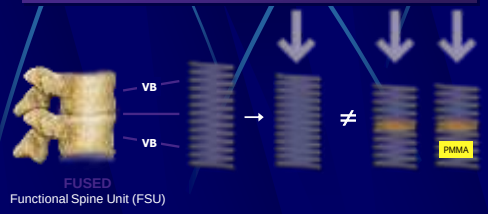
Deformity alone leads to serious health consequences

- The highest standard of non-surgical management <u>does not</u> prevent deformity, leading to:
  - Future fracture
  - Impaired health
  - Loss of physical function
  - Loss of QOL

Reginster – Osteoporos Int 2002

Biomechanics of the Spine

Fusion Does Alter Load Transfer because the Least Stiff Component (the disc) has been stiffened



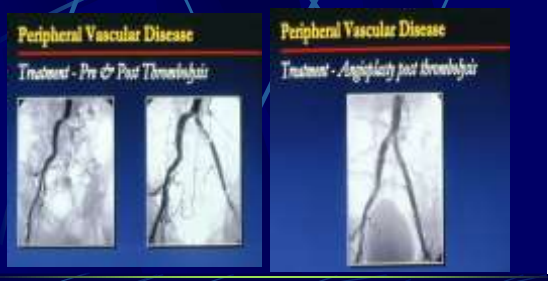
FUSED
Functional Spine Unit (FSU)

Literature Reports that Deformity Correction is Important

- Deformity
- Debilitation
- Disability
- Depression
- Death

PVD: TREATMENT

PVD: Lysis, PTA/Stents



RENOVASCULAR HYPERTENSION

Chronic Mesenteric Ischemia: Pre/Post

Restenosis- Interventionalist's nightmare

- Early occlusion: acute thrombosis
- 2-6 mth: neointimal hyperplasia
- 1-2 yr:progression of disease
- Assisted Patency: PTA, IVBrachytherapy,
- DRUG COATED STENTS!

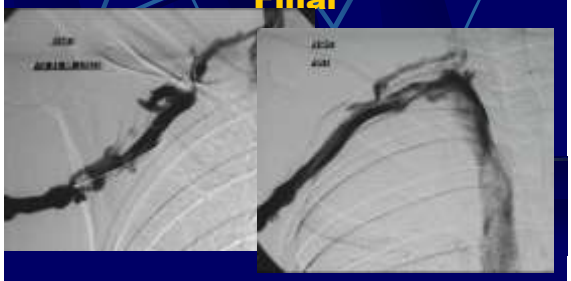
Case Study

- 19 yr old Male, 3 day old symptoms secondary to trauma one year prior.
- Clot: 10 cm in right subclavian vein
- Reteplase (rPA) - 0.5 u/hr for 4 hours, then 0.25 u/hr
- Complete resolution of clot confirmed by angiography at 23.5 hours.
- Critical stenosis resolved by cutting balloon and PTA

Excellent result – no residual clot and brisk venous flow

Case Study – Pre Lysis

Case Study - Post-Lysis / Final

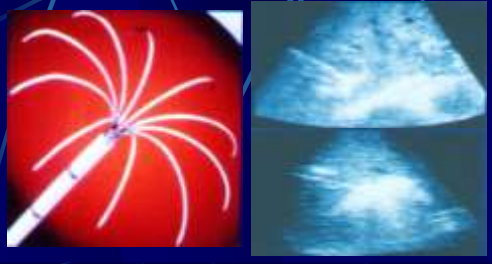


Complete Lysis: Valves and Vessel

IR: EMERGING ROLE IN CANCER THERAPY

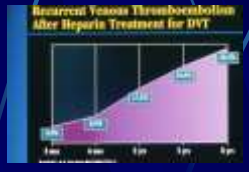
- Precision image guided targeted therapy- Angio, CT, US, CT, MRI guidance
- Placement of catheters for chemotherapy/longstanding IV support- Chestports, armports, Groshongs, Hickmans, PICCs, Plasmapheresis
- Liver-chemoembolization, RF ablation, acetic acid, alcohol therapy
- Relieving malignant obstructions-biliary, nephroureteral, tracheal, esophageal, colonic

Liver Metastases:RF ablation



Liver Mets.: pre/post Chemoembolization

ACUTE DVT: Failure of routine anticoagulation

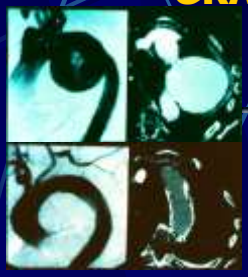


- Clot dissolution only 14-20% with std heparin therapy
- Clot propagation not at all guaranteed
- PE –33-50% pts.
- Chronic sequalae of Venous hypertension : 25-70%

Ac DVT: Rationale for Lytic & Adjunct therapy

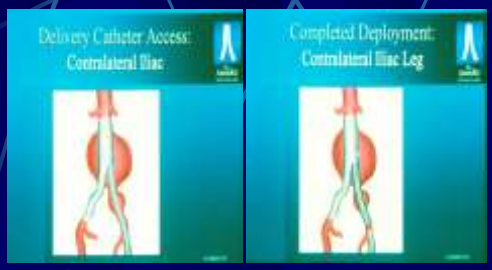
- Clot dissolution & preservation of valve function
- Decrease PE
- Decrease recurrence
- Prevent chronic venous hypertension

ENDOVASCULAR STENT GRAFTS



- AAA- Aneurx (Medtronic AVE), Encure (Guidant),Excluder (Gore)
- Suprarenal/mid aorta- Talent
- Thoracic-Gore device, shelf design
- Thoraco-abdominal: experimental

AAA: AneuRx Stent Graft



CONCLUSION : IR

- Rapid recovery period with minimal tissue disruption with faster healing
- Despite minimally invasive procedure clinical outcome comparable to open surgery
- Risks and complications are less compared to open procedures
  - THANK YOU FOR YOU ATTENTION!