Transarterial Chemoembolization (TACE) of Hepatocellular Carcinoma (HCC)

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OVERVIEW:

- Introduction to TACE
- Indication and contraindications
- Brief history of patient
- Technique
- Complications
- Follow up
- Outcomes
- Future evolution of TACE
WHAT IS TACE?

- A targeted therapy for HCC confined to the liver
- Launched by Yamada as a palliative treatment in patients with non-operable HCC
- Sedliger technique
- Catheter in Femoral artery → Aorta → Hepatic artery
- Chemotherapeutic agent & embolising agent
Principles - two fold

- Delivering high concentration of chemo therapeutic agent to the tumor
- Cutting off the blood supply and essentially starving it to death

http://www.idahoarteryandvein.com/treatments/chemoembolization.php
Rationale for TACE:

- In HCC, Hepatic artery supplies 90 to 100% of blood

- In non tumorous liver, Portal vein supplies 75 to 83% of blood while Hepatic artery supplies 20 to 25% only
Effects of TACE:

- In TACE, high concentration of drug to HCC but much less to non-tumorous liver
- Lipoidal - slow release of drug from lipoid drug emulsion -- prolonged contact time of tumor cells to drug
- Particle embolisation - Synergistic effect of tumor necrosis due to ischemia and drug effects
- Slows down blood flow - increases contact time
- Ischemia induces trans membrane pump - greater absorption of drug
Candidates:

- Palliative treatment for unresectable HCC
- Patients on transplant list
- Prior to Radio frequency ablation
- Residual tumors
- Patients with metastatic neuroendocrine tumors in liver
Contra indications:

**ABSOLUTE**
- Extensive liver disease
- Encephalopathy
- Large burden metastatic disease outside the liver

**RELATIVE**
- Borderline Liver function
- Total bilirubin >4mg/dl
- Serum creatinine >2mg/dl
- Portal vein thrombosis
- Uncorrectable coagulopathy
- Poor general health
- Significant AV shunting through tumor
- Anaphylactic reaction to chemotherapeutic drugs, contrast
OUR PATIENT:

- 74 y.o. male with chronic Hep C infection and liver cirrhosis
- Dx with well differentiated HCC by Biopsy 5 months ago
- On CT - HCC without evidence of metastatic disease cirrhotic liver, mild splenomegaly with mild gastro esophageal varices, changes in lung consistent with pulmonary fibrosis and emphysema and aortic valve calcifications
- enrolled himself in RFA trial
Post RFA: CT demonstrated successful ablation with some residual tumor in segment VIII of the liver.
Post RFA: HCC in segment VIII of Liver measuring 6.2cm TV * 6.4cm AP * 6cm cc.

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Patient preparation:

- Clotting parameters should be checked and corrected
  
  - Platelet count ideally >1,00,000 cells/mm³
  - INR < 1.5

- NPO status for at least 8 hrs prior to sedation/anesthesia

- Good iv hydration

- pre medication: antibiotics
  - anti emetics
• Informed consent
• Anesthesia:
  Local anesthesia with lidocaine moderate sedation - divided doses of midazolam and fentanyl
• Total time - 1hr 25min
Technique

- Access to the Right femoral artery
Diagnostic arteriograms:
- SMA to exclude the aberrant supply to the tumor
- to demonstrate the patency of portal vein
• Advanced to Celiac artery
• Advanced further into Common Hepatic artery
• using micro catheter advanced into main segment VIII artery
• Delivery of chemo embolization mixture (lipoidal and doxorubicin) under continuous fluoroscopic visualization.
• Additional embolization to near stasis was performed using 100 micron Embozene.
• Catheter/sheath removal and groin access hemostasis

Post TACE CT

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Follow-up

- CT FINDINGS
  - after 24 hrs
  - 1 month
  - 2 months
  - every 6 months there after
SEQUENCE OF CT SCANS FOLLOWING TACE, SHOWING THE DEVELOPMENT OF INTRATUMORAL NECROSIS AND DISAPPEARANCE OF THE TREATED LESION

COMPLICATIONS:

- Most common is **Post embolization syndrome** in 80% Triad of Abdominal pain, Nausea, Fever
- Liver abscess
- Non target embolization
- Liver abscess
- Septicemia
- Irreversible liver failure
- Hepatorenal syndrome
OUTCOMES:

- The survival rates of TACE are appx. 60% to 80% at 1 year, 30% to 60% at 2 years, 18% to 50% at 3 years.
- Studies have shown that TACE combined with RFA improved the overall survival compared with that of TACE alone.
WHO criteria for Tumor assessment

- **COMPLETE RESPONSE** - The disappearance of all known disease, determined by 2 observations not less than 4 weeks apart

- **PARTIAL RESPONSE** - 50% or more decrease in total tumor size of the lesions which have been measured to determine the effect of therapy by 2 observations not less than 4 weeks apart and there can be no appearance of new lesion

- **NO CHANGE** - 50% decrease in total tumor size cannot be established nor has a 25% increase in size of one or more measurable lesions been demonstrated

- **PROGRESSIVE DISEASE** - 25% increase in size of one or more measurable lesions, or the appearance of new lesions
Future evolution of TACE:

- Anti-VEGF antibodies in combination with TACE
- Ultra selective catheterization of tumor feeding arteries
- TACE in combination with p53 gene therapy.
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