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COMPARING EFFECTS OF C-ARM CONE BEAM CT AND HYBRID-CT/C-ARM SYSTEMS ON PATIENT RADIATION DOSE IN TRANSARTERIAL CHEMOEMBOLISATION PROCEDURESL. K. Jin¹, W. F. K. Sheng², C. J. M. S. Xavier², L. Sum²¹Lee Kong Chian School of Medicine, Nanyang Technological University-Imperial College London, Singapore 308232²Department of Vascular and Interventional Radiology, Singapore General Hospital, Outram Road, Singapore 169608**Background/Purpose:**

C-arm cone-beam computed tomography (CBCT) and hybrid-CT/C-arm are the two main systems used to perform transarterial chemoembolization (TACE). However, CBCT poses certain disadvantages compared to hybrid-CT/C-arm such as smaller field-of-view and inconsistent anatomical detail. The study aims to further evaluate the difference in patient radiation dose between usage of CBCT and hybrid-CT/C-arm in TACE procedures.

Materials and Methods:

TACE procedures performed between July 2016 and July 2022 were collected and grouped by imaging modality (3D-guided vs only 2D) and imaging system (C-arm CBCT vs hybrid CT/C-arm). Differences in patient characteristics and patient radiation dose were analysed. Kerma-area product (P_{KA}) and dose-length product (DLP) were converted to effective dose (ED) for comparison. Reference air-kerma ($K_{a,r}$) was also collected.

Results:

A total of 378 procedures was analysed with 348 undergoing 3D-guided procedures and 30 undergoing 2D-guided procedures. Of the 3D-guided procedures, 176 were performed using C-arm CBCT and 172 were performed using hybrid-CT/C-arm. The total ED in the hybrid-CT/C-arm group was 1.5 times lower than in C-arm group (median 37.9 vs 55.3mSv, $p < .001$). Total KAP and $K_{a,r}$ were both lower in the hybrid-CT/C-arm 3D group than the C-arm group (median 123.3 vs 248.3Gycm², $p < .001$ and 1030 vs 1153mGy $p = 0.043$ respectively). Within the patients undergoing 2D-guided procedures, KAP, ED and $K_{a,r}$ were all significantly higher in patients who performed procedures in hybrid-CT/C-arm IR suites than in those who performed procedures in the C-arm IR suites (median 136.3 vs 53.3Gycm², $p = 0.030$; 21.8 vs 8.53mSv, $p = 0.030$ and 1011 vs 307mGy, $p = 0.026$ respectively).

Conclusion:

Usage of C-arm CBCT during TACE procedures significantly increased patient radiation dose as compared to hybrid CT/C-arm. More widespread usage of hybrid-CT/C-arm in the context of TACE procedures is recommended to reduce patient risk of stochastic and deterministic effects.

RIGHT INFERIOR PHRENIC ARTERY SUPPLY OF HEPATOCELLULAR CARCINOMA (HCC) DURING TRANSARTERIAL CHEMOEMBOLISATION (TACE): EVALUATION OF THE ORIGIN, CLINICAL SIGNIFICANCE, CHARACTERISTIC AND COMPLICATION

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Background:

HCC is the most common type of primary liver cancer (80%) and the 6th most common liver cancer worldwide. Transarterial-chemoembolization (TACE) is a minimally-invasive procedure and remains the treatment of choice for intermediate-stage HCC. Extrahepatic blood supply most commonly arises from the Right Inferior Phrenic Artery (RIPA). Knowing RIPA variations will help increase the therapeutic efficacy of TACE leading to successful treatment of HCC.

Materials and Methods:

We present 17 patients with RIPA supply to HCC detected from 2021-01-01 to 2022-08-13 during chemoembolization performed at our center.

Results:

RIPA origin from the right renal artery was noted in 11 patients (64%). Less common origins of RIPA supply were from the right adrenal artery, aorta, coeliac axis, and inferior pancreaticoduodenal artery (IPDA). RIPA which arises from the IPDA branch of Superior Mesenteric Artery. There were 14 patients (82%) with lesions arising from Segment VII/VIII of the liver. Two patients (12%) have RIPA supply to Segment IV lesion (10th and 11th TACE). Segment VI lesion supplied by RIPA was seen in one patient. RIPA supply was detected in patients undergoing their first to 11th TACE session with a median of 5th TACE session. All the lesions were peripherally located and abutting the diaphragm. The size of the lesions ranges from 3.7 cm – 20.0 cm (mean = 7.4 cm). Chemoemulsion of iodized oil (Lipiodol; André Guerbet, France) and chemotherapeutic drugs (Epirubicin and Mitomycin) were used for chemoembolization in 16 of the patients (94%). Lipiodol deposition was seen at the head of the pancreas (1 patient), adrenal (1 patient), and diaphragm (1 patient) on post TACE CT with no significant sequelae. The diaphragmatic injury was seen in one patient for whom DC Beads were used for chemoembolization.

Conclusion:

RIPA supply of HCC was associated with a large, peripherally located tumour in Segment VII/VIII that was abutting the diaphragm. Familiarity with the origin of RIPA is important in treating large right lobe HCC. The right renal artery is the most common RIPA origin in our series.

TREATMENT OUTCOMES OF SCLEROTHERAPY FOR LOW-FLOW VASCULAR MALFORMATIONS AT SOUTHERN PHILIPPINES MEDICAL CENTER

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Background/Purpose:

Vascular malformations are complex developmental disorders of angiogenesis that present formidable diagnostic and treatment challenges. In the past, surgical resection was the preferred treatment for low-flow vascular malformations. Recently, percutaneous sclerotherapy has shown many advantages over surgery and has emerged as the primary therapeutic approach. The main purpose of this study is to report the treatment outcomes of low-flow vascular malformations at Southern Philippines Medical Center (SPMC), a tertiary government hospital in the Philippines.

Materials and Methods:

This is a retrospective study assessing the treatment outcomes of patients who underwent percutaneous sclerotherapy for low-flow vascular malformations at SPMC over a 5-year period from Jan. 2017 to Jan. 2022. The main objective is to determine which among the sclerosing agents (ethanol, bleomycin or combination) used for low-flow vascular will be the most effective in terms of treatment imaging outcomes and the least procedure-related complications.

Results:

A total of 36 patients between 1 year old and 69 years old were treated (26 venous malformations and 10 lymphatic malformations). Sclerosing agents used were ethanol (15 cases), bleomycin (8 cases) and combination of ethanol / bleomycin (13 cases). After a median follow-up at least 6 months after the last session, 35 cases (97.25%) had effective imaging outcomes defined as more than 50% reduction of the original size and only 1 case (2.8%) of bleomycin treatment was ineffective with reduction of less than 50%. 5 minor complications (13.8%) were observed (4 cases [11.1%] for ethanol and 1 case [2.7%] for combination of bleomycin and ethanol). No major complications were noted.

Conclusion:

Percutaneous sclerotherapy is an effective treatment for low flow vascular malformations with least complications when using bleomycin and combined bleomycin/ethanol as sclerosing agents, compared to ethanol alone.

EFFECTIVENESS OF AN INSTITUTIONAL ANTIBIOTIC PROPHYLAXIS GUIDELINE IN PATIENTS UNDERGOING RADIOFREQUENCY AND MICROWAVE ABLATION OF LIVER TUMORS: A RETROSPECTIVE COHORT STUDY

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Background/Purpose:

At our institution, patients undergoing liver ablation were receiving antibiotic prophylaxis (AP) heterogeneously. An in-house antibiotic prophylaxis guideline was developed in May 2019 by the antimicrobial stewardship unit and the department of vascular and interventional radiology to standardize AP prescription. This study evaluated the effectiveness and clinical outcomes of the newly launched AP guideline on patients undergoing radiofrequency (RFA) and microwave (MWA) ablation of the liver.

Materials and Methods:

This was a retrospective cohort study of patients who underwent RFA and MWA at Singapore General Hospital before and after the implementation of guidelines from November 2018 to April 2019 and October 2019 to March 2020 respectively. Patients with prior infection or on antibiotics treatment before liver ablation were excluded. Patients without high risk of biliary tree contamination were recommended a single dose of 2g IV cefazolin (or 600mg IV clindamycin in cases of beta-lactam allergy). Any deviation in antibiotic choice or duration without suspected post-procedural infections was considered inappropriate. Univariate analysis was conducted to evaluate the clinical outcomes.

Results:

The study included 87 patients who underwent 93 procedures consisting of 18 RFAs and 75 MWAs for liver tumours. Concordance with AP guidelines improved significantly (38.5% vs. 87.0%; $p < 0.001$). Prescription of the recommended single dose 2g IV cefazolin for patients without high-risk factors increased after the guideline was implemented (40.0% vs. 97.8%). There were no ablation-related infections and mortality within 30 days post-ablation, and post-procedural nausea and vomiting were significantly reduced (15.4% vs. 1.9%; $p = 0.020$). No significant difference in post-procedural fever (7.7% vs. 5.6%; $p = 0.693$), chest and/or abdominal pain (5.1% vs. 7.4%; $p = 1.000$) were noted.

Conclusion:

The newly implemented in-house antibiotic prophylaxis guideline streamlined AP prescribing in patients undergoing RFA and MWA. Additional research is needed to determine the effects on infection and mortality in patients with high-risk of biliary tree contamination.

PERCUTANEOUS MICROWAVE ABLATION OF BENIGN BREAST LESION: A REPORT OF TWO PIONEER CASES IN MALAYSIA

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Case Description:

Fibroadenoma is the commonest type of benign breast lesion (BBL) resulting from proliferation of ductal or lobular tissue which manifests by the presence of palpable lumps. Fibroadenoma is conventionally open excised in our local setting. However, surgical excision is more destructive to breast tissues and hence cosmetic outcome is less desirable. We report two cases of attempted fibroadenoma resolution via ultrasound-guided percutaneous microwave needle ablation without cutting and removing any breast tissue.

Case 1 was a 21-year-old lady who presented with a palpable left breast lump for 6 months at 1 O'clock region 3 cm from nipple measuring 1.1x2.3cm.

Case 2 was a 30-year-old lady who presented with two palpable right breast masses for 12 months duration one at the 7 O'clock region 4cm from nipple measuring 1.0x1.9x1.7cm and the other at the 10 O'clock region 3cm from nipple measuring 0.8x1.2x1.3cm.

Triple assessments were done for both of them and the diagnosis was later confirmed by histopathology examination as fibroadenoma. Patients were counselled and both keen for a treatment which was less invasive and would preserve the cosmetic appearance of the treated breast. Therefore, percutaneous microwave needle ablation was offered as a pioneer means of intervention.

During the procedure a 1.6mm antenna needle was inserted into the targeted breast lump under real time ultrasound imaging guidance, to ablate the tumor. A small waterproof plaster was applied on the needle nick after the procedure. No immediate post procedural complications were observed.

Discussion/Conclusion:

These two cases illustrate a feasible and good patient acceptance of microwave needle ablation as an alternative minimally invasive approach without the need to have an open wound or stitching. It reduces the likelihood of scarring and preserves the cosmetic appearance of the breast. An aesthetically pleasing result was achieved for both patients in a span of 15 mins, respectively. Patients will be continually reviewed via scheduled breast ultrasound for the intervals of 1, 3, 6, 12 and 18 months to monitor for complete ablation.

ADRENAL VENOUS SAMPLING (AVS) PROCEDURE USING CONE BEAM CT; NATIONAL CANCER INSTITUTE'S EXPERIENCE

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Introduction:

Adrenal Venous Sampling (AVS) is the gold standard test to identify sources of excess aldosterone. It is highly advisable to perform this procedure for a patient with Primary Aldosteronism. It can determine the overproduction of the aldosterone whether it is unilateral or bilateral. The test will provide a decisive treatment plan for the patient. A unilateral secretion can be surgically treated.

Case Report:

AVS procedure has a reputation as a challenging procedure and demands great skills of the Interventional Radiologist (IR). Sampling is performed from each adrenal vein together with peripheral samples using variation of catheter in sequential or simultaneous manner. Anatomically, the right adrenal vein originates directly from the inferior vena cava while the left adrenal vein originates from the left renal vein. Due to the anatomical structure, it is difficult to recognise the adrenal veins for selective cannulations. Technically, the right adrenal vein is more challenging to cannulate than the left adrenal vein. Multiple techniques and strategies are used by the IR to perform AVS procedure. In National Cancer Institute (NCI), Cone Beam CT is used during AVS procedure to aid the selective cannulation of the adrenal veins.

Conclusion:

A conclusion of a successful AVS can be drawn by the level of the cortisol from the derived bloods. Since cortisol is only produced by adrenal glands, it is assumed that there is an increment of cortisol level in the adrenal veins compared with peripheral veins. The result will then be further used to calculate the lateralisation index. We are using this method since the year of 2020, the success rate of AVS sampling is 100%.