## CAR 2022 ASM Scientific Research Project – 1st Place Winner

**Abstract # PRO7OGOOX09**

**Transvenous CSF-Venous Fistula Embolization in Spontaneous Intracranial Hypotension**

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**PRESENTER'S LEVEL OF TRAINING:** Radiologist

**OBJECTIVE:** Endovascular transvenous embolization is emerging as a highly efficacious minimally invasive treatment for patients with CSF-venous fistulas (CVF) associated with spontaneous intracranial hypotension (SIH). We sought to independently validate this novel technique in our singlecenter cohort of consecutively treated CVF patients.

**METHODS:** We retrospectively reviewed our series of patients with SIH from CVF who underwent transvenous embolization at the Mayo Clinic, Florida. All CVFs were confirmed on lateral decubitus digital subtraction or CT myelography. Pre- and post-embolization Headache Impact Test (Hit-6) and Patient Global Impression of Change (PGIC) scores were used to assess clinical response to treatment. The Bern SIH score and its individual radiologic components were evaluated on pre- and post-embolization brain MRI.

**RESULTS / DISCUSSION:** Eleven patients (age range 47 - 73 years, 73% female) underwent transvenous embolization for CVF. Patient demographics in addition to pre- and post-embolization clinical and imaging findings are listed in the Table. Last clinical and imaging follow-ups ranged between 4-28 weeks and 1-42 weeks after embolization, respectively. Ten patients (91%) reported complete resolution of symptoms and were "very much improved" on post-operative PGIC (PGIC score of 1). Eight of nine patients (89%) had marked improvement of headaches (mean Hit-6 score change of -30 ± 12 and mean post-embolization Hit-6 score 40 ± 10 for patients presenting with headache); two patients did not have headaches at baseline. Concordant with clinical improvement, post-operative Bern Score improved in 8/10 patients (80%) with imaging findings of SIH (Figure showing successful embolization and pre-and post-embolization MRI findings for one of the patients); one patient had normal brain MRI at baseline. There were no complications during the follow-up.

**CONCLUSION:** Transvenous embolization of CVF is a highly efficacious treatment for SIH secondary to CVF as confirmed in our independent cohort.

## CAR 2022 ASM Scientific Research Project – 2nd Place Winner

**Abstract # PROHYHBZ3AC**

**Can Dual Energy CT Differentiate Between Types of Peri-articular Mineralized Foci?**

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**PRESENTER'S LEVEL OF TRAINING:** Fellow

**OBJECTIVE:** To investigate if atomic number (Z) obtained by dual-energy CT is able to differentiate between types of periarticular mineralized foci.

**METHODS:** IRB-approved retrospective study. The study included 131 cases where peri-articular mineralized foci were identified on second and third generation dual-source dual-energy CT (Somatom Siemens Flash and Force, Siemens Healthineers). Two musculoskeletal radiologists evaluated the cases and classified them according to the most likely diagnosis based on the radiological appearance and clinical presentation into 4 categories (calcium hydroxyapatite deposition disease (HADD), uric acid deposition (UA), calcium pyrophosphate deposition disease (CPPD) and other bone fragments). A third MSK radiologist evaluated if initial categorisation differed. Three fellows in MSK radiology independently processed the cases with dual-energy CT using the Rho/Z application (Syngo.via, version VB40, Siemens Healthineers). A region of interest (ROI) was drawn over the dominant focus of mineralization and ROI size and Z values were recorded.

**RESULTS / DISCUSSION:** 4 groups of cases each were created. Atomic number values for uric acid, CPPD, HADD and other bone fragments were 7.56 +/- 0.52, 9.16 +/- 0.91, 10.88 +/- 1.23, and 10.53 +/- 0.79 respectively. A post-hoc Tukeys test was performed to assess for specific pairs that had significant difference in their mean value. All groups had a significant difference ($p<0.05$). 4 groups of cases each were created. Atomic number values for uric acid, CPPD, HADD and other bone fragments were 7.56 +/- 0.52, 9.16 +/- 0.91, 10.88 +/- 1.23, and 10.53 +/- 0.79 respectively. A post-hoc Tukeys test was performed to assess for specific pairs that had significant difference in their mean value. All groups had a significant difference ($p<0.05$).

**CONCLUSION:** The atomic number obtained by the Rho/Z application on dual-energy CT is able to differentiate between uric acid, CPPD, HADD and other mineralized foci which can help narrow the differential diagnosis when seen in clinical practice.

## CAR 2022 ASM Scientific Research Project – 3rd Place Winner

**Abstract # PROR6VO4EZM**

**Cochrane "Living" Systematic Review on Diagnostic Accuracy of Imaging for COVID-19: Version 4**

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**PRESENTER'S LEVEL OF TRAINING:** Other medical professional

**OBJECTIVE:** To evaluate the diagnostic accuracy of thoracic imaging in people with suspected COVID-19. We assessed threshold effects of index test positivity on accuracy.

**METHODS:** We searched the COVID-19 Living Evidence Database from the University of Bern, the Cochrane COVID-19 Study Register, The Stephen B. Thacker CDC Library, and repositories of COVID-19 publications through to 17 February 2021. We included diagnostic accuracy studies of all designs, except for case-control, that recruited participants of any age group suspected to have COVID-19 and that reported estimates of test accuracy. The studies that used imaging as a reference standard. Risk of bias and applicability concerns were assessed by using QUADAS-2. The authors independently and in duplicate extracted data. We presented sensitivity and specificity per study on paired forest plots, and summarized pooled estimates in tables.

**RESULTS / DISCUSSION:** Ninety-four studies were included. The pooled sensitivity of chest CT (69 studies, 28285 participants, 14342 (51%) cases) was 86.9% (95% CI 83.6-89.6), and pooled specificity was 78.3% (95% CI 73.7-82.3). The pooled sensitivity of chest X-ray (17 studies, 8529 participants, 5303 (62%) cases) was 73.1% (95% CI 64.1-80.5), and pooled specificity was 73.3% (95% CI 61.9-82.2). The pooled sensitivity of ultrasound (15 studies, 2410 participants, 1158 (48%) cases) was 88.9% (95% CI 84.9-92.0), and the pooled specificity was 72.2% (95% CI 58.8-82.5).

**CONCLUSION:** Chest CT and ultrasound are sensitive and moderately specific for the diagnosis of COVID-19. Chest X-ray is moderately sensitive and moderately specific for the diagnosis of COVID-19.