

## Research – First Place

**First Author: Dania Shah, MD**

Additional Authors: Wesley Peng, Rustan Sharer, M.D., Priya Radhakrishnan, M.D.

Program: HonorHealth

Title: Role of telemedicine in healthcare delivery to the vulnerable population during COVID-19- a retrospective study

Media Link: <https://youtu.be/sv-fCmXC9k8>

**Abstract:** Background –Telemedicine, refers to the practice of medicine from a distance with the aid of technology, typically videoconferencing or assisted by telephone. Adoption of telemedicine was a part of the COVID-19 public emergency declaration to provide care for patients safely .

Despite advances in technology, there is wide gap in access to healthcare between White Americans and communities of color. The current pandemic serves as an opportunity for telemedicine to provide equitable care.

**Objective –** To evaluate telemedicine adoption and utilization trends during COVID19

pandemic within a medical group with special focus on under-represented minority population.

**Methods –** We examined our telemedicine data and stratified based on age, ethnicity, and visit type; a 2- prop z-interval was performed analyzing all general encounters.

**Results –**From March 2020 onwards, we offered video visits in conjunction with telephone. The total number of virtual visits delivered that month were 70,089. Of these, 22,132 (31.58%) were video visits and 47,957 (68.42%) were tele-visits. Patients identified as Hispanic or Latino showed a 40.5% increase (p-value < 0.0001) and Black Americans p-value < 0.004) showed a 22% rise in the total number of visits with video and telephone visits compared to pre-implementation. This difference was statistically significant. Interestingly, there was a steep rise in no-show rates in the group 65+ from March to May but the rates significantly declined and reached a steady state. There was significant drop in the no-show rates in the African American and Medicaid population by 4.9% and 5%, respectively after the telemedicine implementation.

**Conclusions –**Our study shows virtual visits improved the ability to provide care for communities of color, by over 40% which shows that telemedicine can break barriers in health care delivery and decrease health inequity. It could be attributed to the fact that minority groups lack access to transportation and availability and thus, virtual visits have empowered them to receive the adequate care that they need. We also see that once individuals 65+ overcome the difficulty with adapting to technology, they did well with telemedicine indicating that if elderly community is provided with appropriate tech support they will in fact prefer virtual visits over office visits.

## Research – Second Place

**First Author: Helen Bartels, M.B. B.Chir.**

Additional Authors:

Program: Mayo Clinic Arizona

Title: Cavitory Coccidioidomycosis

Media Link: no link submitted

Abstract: Introduction

Pulmonary coccidioidomycosis is an important cause of morbidity in Southwestern USA, with complications including pulmonary cavitation [1, 2]; treatment has traditionally been limited to amphotericin B, with or without surgery [2, 3], in this study we aimed to assess the potential role of azole drugs.

Methods

We conducted a retrospective review of Mayo Clinic Arizona patients with cavitory pulmonary coccidioidomycosis; diagnosis was based upon CT of the chest, serology, PCR, pathology/cytology and symptoms. Patients were categorized by whether or not they received antifungal treatment within  $\leq 28$  days of diagnosis of the cavity/cavities and time to cavity closure, radiologically. We excluded patients with confounding comorbidities such as lung cancer or other cavity-causing infections.

Time to cavity closure was compared between the patients on treatment at or within  $\leq 28$  days of diagnosis and those who were not. Patients who required surgical resection of their cavities were considered to have failed medical therapy.

Results

Patients who were already on antifungal treatment or commenced treatment within  $\leq 28$  days of cavity diagnosis, were 120% (HR = 2.2) more likely to experience a cavity closure at any point in time compared to a patient not being treated with antifungals (95% CI 1.39 – 3.46). When adjusted for patient demographics and comorbidities, patients who received antifungal treatment at the time of cavity identification were 225% (HR = 3.25) more likely to experience a cavity closure at any point in time as a patient not being treated with antifungals (95% CI 1.62 – 6.53).

Conclusions

Symptomatic, primary coccidioidomycosis infection commonly presents as pneumonia [1, 4]; current data suggests that 5 to 15% of patients with pulmonary coccidioidomycosis go on to develop pulmonary cavities [1,2]. Most of these cavities resolve spontaneously without the need for intervention [1], but a small proportion cause complications such as hemorrhage, pneumothorax or empyema [2, 5]. Some cavities fail to close even after many years of follow up. It has been established that symptomatic patients should receive antifungal therapy, with surgical resection an option for those who fail to respond to therapy, or in whom symptoms recur when therapy is discontinued [5, 6]. Prior to the introduction of the azole drugs, management was limited to radiological monitoring, amphotericin B therapy or surgery plus amphotericin B therapy [2, 3].

Prior studies have examined the efficacy of azole drugs in treating disseminated coccidioidomycosis [6, 7] but there is a paucity of data analyzing their use for treatment of pulmonary coccidioidomycosis cavities. Our findings were consistent with available data and we therefore recommend that patients with symptomatic cavitory coccidioidomycosis receive treatment with an azole drug [6]. Fluconazole is an acceptable first-line option and should be started promptly, ie within  $\leq 28$  days of diagnosis. More work still needs to be done to determine appropriate treatment protocols.

Research – Third Place

**NONE AWARDED**

## Case Report – First Place

**First Author: Saira Khan, MD**

Additional Authors: Avtar Singh, M.D., Kaivan Salehpour, M.D.

Program: Mayo Clinic Arizona

Title: To Quarantine or Not to Quarantine? A Ballad of Lobar Pneumonia

Media Link: <https://youtu.be/TE9KZbtaxew>

Abstract: Introduction:

Variable clinical presentations of COVID-19, caused by SARS-CoV-2, make diagnosis heavily reliant on screening tests; however, we present an unusual case of COVID-19 manifesting as lobar pneumonia with multiple negative SARS-CoV-2 nasopharyngeal (NP) RT-PCR tests, highlighting the importance of pre-test probability in the setting of variable screening test accuracies.

Case:

A 57 year-old male with history of obstructive sleep apnea presented for SARS-CoV-2 testing due to 5 days of fever, chills, nausea, and diarrhea. On presentation, he was febrile, tachycardic, and hypoxic to 90% on room air. RT-PCR SARS-CoV-2 test returned negative, and chest x-ray revealed right-sided lobar consolidation, more suggestive of bacterial than viral pneumonia. Complete blood count and basic metabolic panel on admission were normal, and pro-calcitonin was elevated. He was admitted for sepsis likely due to lobar pneumonia, and COVID-isolation precautions were removed. Days 7-8 from symptom onset showed worsening hypoxia despite antibiotic intervention. Repeat SARS-CoV-2 nasopharyngeal RT-PCR returned negative, marking the third negative test over a span of 4 weeks; with several negative tests, COVID-19 pertinent labs were not drawn. On day 10, pulmonology was consulted but deferred bronchoscopy due to risk-benefit considerations. By day 11, infectious diseases was consulted, who recommended restarting COVID-19 precautions due to high pretest probability of the virus despite negative nasopharyngeal swabs. Repeat CT chest showed worsening lobar pneumonia, and new multifocal involvement of the left and right lobes. COVID-19 severity-associated labs were elevated, including lactate dehydrogenase, d-dimer, and sedimentation rate. Pulmonology performed diagnostic bronchoscopy which revealed positive SARS-CoV-2 PCR from bronchoalveolar lavage. After being started on dexamethasone and remdesivir, he was discharged on room air on day 17.

Discussion:

The sensitivity of SARS-CoV-2 diagnostic tests (RT-PCR) is widely variable, evaluated at approximately 70% in Wuhan, China,[1] and between 58-96% in New York.[2] Test sensitivity is difficult to ascertain due to lack of reference standard for measuring sensitivity in asymptomatic patients; for example, positive patients can be referenced against clinical diagnosis. Because of testing limitations, using alternative samples for diagnosis may also be utilized to guide care. While nasopharyngeal RT-PCR is typically used to diagnose SARS-CoV-2, one study showed that 3 out of 16 bronchoalveolar lavage tests returned positive for SARS-CoV-2 despite negative nasopharyngeal testing.[3] In a study of 1070 collected specimens from 205 SARS-CoV-2 positive patients, BAL had the highest positive rate (14 of 15; 93%) compared to pharyngeal swabs (126 of 398; 32%).[4]

Conclusion:

Due to largely unknown sensitivities of SARS-CoV-2 diagnostic tests, pre-test probability should guide clinical diagnosis and treatment of COVID-19 and alternative diagnosis methods, including bronchoalveolar lavage.

## Case Report – Second Place

**First Author: Tro Sekayan, MD**

Additional Authors: Eddie Khav, D.O., Noura Eleid, M.D., Susan Wilkinson, M.D.

Program: Verde Valley Medical Center

Title: A Patient with Primary Cutaneous CD8+ Aggressive Epidermotropic Cytotoxic T Cell Lymphoma (AECTCL)

Media Link: <https://youtu.be/PVrk7Yjj3w0>

**Abstract:** CD8+ aggressive epidermotropic cytotoxic T-cell lymphoma (AECTCL) represents 1–2% of all cutaneous lymphomas (1,2) and is characterized by ulcerated lesions, aggressive clinical behavior, and a poor prognosis (3).

An 85-year-old Caucasian female with past medical history of COPD, hyperlipidemia and irritable bowel syndrome presented to her primary physician with a new-onset pruritic right upper shoulder lesion (09/2019). Multiple diagnoses were explored, including dermatophytosis, pityriasis rosea, bullous impetigo, and subcutaneous lupus erythematosus. An initial skin biopsy was inconclusive, and treatment with topical/oral antifungals, antibiotics, hydroxychloroquine and prednisone provided no relief. The patient developed adverse effects from therapy, with progression to widespread severe pruritic lesions, widespread open sores, and alopecia. A second skin biopsy was obtained 07/2020 and shortly afterwards the patient was hospitalized with complaints of dyspnea and weakness.

On admission (08/2020), vital signs and physical exam were within normal limits except for extensive skin findings with multiple, widespread, macules/papules between 5-10 mm: 8x6 cm raised, erythematous and crusted mass (left scalp), flat, tender and crusting lesion (right neck), 6x6 cm raised, erythematous, crusting lesion with yellow discharge (right scalp), and ulcerated, tender nodule (left posterior proximal thigh). Labs showed WBC 13.3 (with a normal differential). CTA chest showed right sided pulmonary embolism. Wound cultures of left hip skin ulcer and scalp lesion grew staphylococcus aureus. Apixaban and empiric treatment with cephazolin was commenced. Results of the second skin biopsy showed malignant lymphoid infiltrates consistent with high-grade mycosis fungoides. Considering the clinical presentation, lack of chronic skin disease, and dramatic progression, repeat biopsy was obtained, which confirmed CD8+ AECTCL. Radiation and chemotherapy with doxorubicin, cyclophosphamide, vincristine and prednisone were initiated. Due to side effects and patient's weakened state, patient decided to stop therapy and was transitioned to hospice care.

This case follows a patient's disease course from the emergence of the first lesion in order to illustrate the rapidly progressive nature of CD8+ AECTCL and the difficulty of accurate diagnosis/ treatment of this rare condition. CD8+ AECTCL has a median overall survival of 12-32 months (4-6) and is characterized by abrupt onset of rapidly progressive, widespread, ulcerating plaques, papulo-nodules, progressing to tumors with possible extracutaneous involvement of mucosal surfaces and other organs (3,6). Adnexal involvement at diagnosis is associated with poor outcomes (5,7). Diagnosis is difficult, and is based on clinical findings, disease timeline and biopsy results. The aggressive course of this disease requires high suspicion index for early diagnosis in order to improve the likelihood of patient survival. Currently, there are no standardized therapeutic modalities. Total skin electron beam therapy and chemotherapy regimens have not been shown to be effective, with highest response obtained with hematopoietic stem cell transplant (6).

## [Case Report – Third Place](#)

**First Author: Saad Alkhider, MD**

Additional Authors: Anup Solsi MD, Pallavi Bellamkonda MD

Program: Valleywise

Title: Oxytocin Induced Ventricular Tachycardia in Patient with Long QT Syndrome

Media Link: <https://www.youtube.com/watch?v=Hm3ueLBJUd8>

Abstract: Introduction

Right ventricular outflow tract (RVOT) tachycardia is one of the most common types of monomorphic ventricular tachycardia (VT) that arises in patients without structural heart disease. It is diagnosed based on electrocardiography (ECG) showing wide QRS complex with left bundle block morphology and a rightward/inferior axis near +90 degrees. Although patients with RVOTVT usually remain hemodynamically stable, this type of tachyarrhythmia can induce left ventricular dysfunction and ventricular fibrillation in rare instances. The mechanism causing RVOTVT remains uncertain, thought to be triggered by adenosine sensitive, cyclic AMP mediated triggered activity. Oxytocin is a uterotonic agent used in a variety of obstetrical circumstances, one being induction of labor. Just a handful of cases have reported the arrhythmogenic propensity of oxytocin and its ability to induce RVOTVT in women with known long QT syndrome (LQTS), through a suspected effect on cardiac repolarization. In this case, we describe a rare case of Oxytocin induced RVOTVT in a patient undergoing induction of labor, unknown to have LQTS.

Case Report

A 21-year-old female with no past medical history presented to obstetrics unit for induction of labor. The patient was started on an oxytocin infusion and was noted to develop tachycardia with heart rates between 100 and 120, without shortness of breath or chest pain. EKG showed RVOTVT (rate 98 bpm), QTc was 517. Subsequent transthoracic echocardiography demonstrated an ejection fraction 45-50%, moderately dilated left ventricular cavity, no wall motion abnormalities. The patient delivered vaginally without complications, but post-delivery, remained in VT. She was started on suppressive beta blocker therapy, however dose reduction was required due to bradycardia. Cardiac MRI showed mildly dilated left ventricle with normal function. The patient was discharged on Propranolol. 6 weeks post-partum, Propranolol was discontinued.

Discussion

Oxytocin intravenous bolus was noticed to induce QTc interval prolongation leading to VT, suggesting that it may be proarrhythmic. The clinical course of patients with RVOTVT has almost uniformly been described as benign. This makes it hard to advocate for any treatment to improve the clinical course of the disease. we cannot assert that catheter ablation cures RVOTVT but we would argue that radiofrequency ablation should be recommended early for patients with high-risk characteristics: 1) a history of syncope; 2) very fast VT (>230 beats/min associated with polymorphic VT); 3) extremely frequent ectopy (>20,000 extrasystoles/day) may eventually lead to cardiac dilatation; and 4) ventricular ectopy with short coupling interval (higher the probability for polymorphic arrhythmias).

References

- 1.The cardiologists' worst nightmare JACC Sami Viskin, Charles Antzelevitch PMID16198846
- 2.Journal of Afib treatment or cure of right ventricular outflow tract tachycardia PMID9663319
- 3.Calvo N, Jongblod M, Zeppenfeld K. Radio frequency catheter ablation of idiopathic right ventricular outflow tract arrhythmias. Indian Pacing and ElectrophysiolJ2013;13:14-33. PMID23329871
- 4.QT interval prolongation after oxytocin bolus during surgical induced abortion PMID15470335

## Patient Safety/QI – First Place

**First Author: Kimball Bailey, DO**

Additional Authors: Jorge Rodriguez MD, Raj Shah MD, Drew de Weerd, Jason Klein MD

Program: Abrazo Arrowhead Campus

Title: COVID19 Innovation: Ultra-Safe Shield Use During Ultrasound Imaging

Media Link: <https://youtu.be/JVCxCU8m4JA>

Abstract: Jorge Rodriguez MD, Raj Shah MD, K. Tyson Bailey DO, Drew de Weerd, Jason Klein, MD, FACC

Abrazo Health Network Internal Medicine Residency Program, Glendale, AZ

Introduction: We have an obligation and a priority to protect our vulnerable healthcare imaging professionals at all times, but especially during COVID-19 pandemic. These individuals provide important clinical information and they are a vital part of the healthcare delivery team.

The American Society of Echocardiography published Specific Considerations for Sonographers When Performing Echocardiograms During the 2019 Novel Coronavirus Outbreak: Supplement to the American Society of Echocardiography Statement which stated, "If available, the use of a barrier between the bed (where the patient is lying) and sonographer could be set up prior to imaging"<sup>1</sup>

Objective: The Ultra-Safe Shield, patent pending #63059784, is a safe, effective, and easy to use device that creates an additional layer of protection from droplet and particle contamination that may contain disease causing pathogens. We aim to collect data on the experience of a group of healthcare imaging professionals in various settings who have been using the Ultra-Safe Shield during thousands of ultrasound scans.

The objective of this questionnaire study is to validate the Ultra-Safe Shield as a safe and effective device that can be used as an additional layer of protection beyond standard PPE in the setting of ultrasound image acquisition.

Methods: Four healthcare imaging professionals were selected to beta test the Ultra-Safe Shield in an outpatient setting. The shield was used for various imaging procedure. A total of 6575 procedures were performed using the Ultra-Safe Shield. (N=6575). Each imaging professional was asked to fill out a questionnaire that was delivered in person or by email. Participants were asked a subset of questions using a 5-point Likert scale.

Data from the questionnaires will be collected and presented in bar graph format to best represent the degree to which the respondents agreed with the statements presented. This data will be used in order to reach meaningful conclusions regarding user experience.

Conclusion/Discussion: The Ultra-Safe Shield provides an effective, convenient, and perceived safety barrier between patients and healthcare imaging professionals. Based on imaging professionals' responses to questionnaires, the data strongly supports a positive experience using the Ultra-Safe Shield. Respondents consistently agree that the Ultra-Safe Shield did not interfere with the image/exam quality, did not increase exam times, did not require the examiner to change his/her position during the exam, and could be quickly removed if healthcare professionals needed emergency access to the patient.

Furthermore, respondents agree that they feel more protected against droplet pathogens when compared with standard PPE protocol. In theory, the additional barrier provided by the Ultra-Safe Shield will protect professionals from exposure to droplet pathogens, and this will be explored by using fluorescein simulated cough to qualitatively demonstrate the droplet and particle shielding effect of the Ultra-Safe Shield.

## Patient Safety/QI – Second Place

**First Author: Daniel Alcantar, MD**

Additional Authors: Paul Gomez MD, Joseph Teng MD, Jordan Coulston MD, Alvin Wong MD, Kimberely Bader MD, Avtar Singh MD

Program: UACOM - Phoenix

Title: Improving the Current Rapid Response System by Implementation of a Second Form of Broadcast

Media Link: <https://youtu.be/vZgsm3zmWw8>

Abstract: Introduction:

Rapid response systems are commonly employed by hospitals to identify and rapidly respond to deteriorating patients outside of the intensive care unit (ICU). Rapid response teams (RRTs) are typically multidisciplinary and consist of medical and nursing professionals. They are responsible for the timely evaluation, screening and treatment of patients with signs of clinical deterioration. At the Phoenix Veterans Affairs (VA) Hospital, our rapid response broadcast is reliant on an overhead paging system as the primary form of alerting the RRTs. Unfortunately, this form of broadcast is occasionally not heard or not clear which can potentially lead to late arrival and possible patient complications. The goal of this quality improvement project is to improve timeliness and physician satisfaction with the current rapid response system by piloting a new alert system.

Methods:

We investigated the Phoenix, VA rapid response system by performing a Gemba walk, creating a process flow map, and forming a root cause analyses. All potential stakeholders were interviewed, and potential problems/errors were discussed with each department involved.

Adults greater than 18 years of age, admitted as an inpatient at the Phoenix VA were included. A retrospective chart review of all rapid response forms, from dates 12/01/2020 – 09/08/2020, were reviewed and the average time interval from the “time called” to “arrival time” was calculated. Furthermore, a questionnaire was created pre-intervention to assess physician satisfaction with the current system and compare responses. Patients admitted to the intensive care unit (ICU) were excluded.

The intervention piloted was implementing a paging system, in addition to the overhead broadcasting system, to alert physicians when a rapid response is called. Using this system, a “rapid response team” was created and all physicians involved in rapid responses in the inpatient wards, were added.

Results:

After reviewing rapid response forms, the average time of arrival was 3.25 +/- 2.56 minutes. A month after implementing the paging system, the average time of arrival was 2.67 +/- 2.38 minutes. After distributing the questionnaire to physicians, it showed that 15.6% were extremely confident, 28.1% somewhat confident, 31.3% neutral, 18.8% somewhat not confident, and 6.3% were not confident in the current rapid response system.

Conclusion:

After one month of implementing a second form of broadcast, there has been an improvement in arrival time by 0.58 +/- 0.18 minutes. Based on the questionnaire, there is lack of confidence with the current system, indicating there is need for improvement. Our goal is to continue investigating the rapid response times within the next 6 months and to improve physician confidence with the new intervention.

## [Patient Safety/QI – Third Place](#)

**First Author: Gabriel Ruiz, MD**

Additional Authors: Paul Gomez MD, Daniel Alcantar MD, Alvin Wong MD, Kimberly Bader MD, Avtar Singh MD, Jordan Coulston MD

Program: UACOM - Phoenix

Title: House Staff on the Frontlines, Successful Implementation of a COVID-19 Inpatient Rotation for Residents

Media Link: <https://www.youtube.com/watch?v=CyOGDCfBv8Q&feature=youtu.be>

**Abstract:** The COVID-19 pandemic has put unprecedented strain on Internal Medicine Residency Programs across the country. The purpose of this study was to evaluate how well our residents met educational objectives for the COVID-19 inpatient rotation at the Phoenix VA Health Care System.

Inpatient medicine specific learning objectives were created by program faculty prior to residents starting on the COVID-19 service. The objectives were organized by ACGME core competency and included sections on patient care and medical knowledge, practice-based learning and improvement, interprofessional communication skills, systems-based practice, and professionalism. A total of 6 residents participated over the first 2 months of the rotation. A survey was created which included all the educational objectives and residents were asked to rate each objective based on the following scale (0=unable to answer, 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

Results of the survey showed that residents felt confident in meeting the learning objectives with average scores of either 4 or 5. Average census over the first two months was 7 patients total for teams that included a direct care hospitalist, one senior resident (either PGY2 or PGY3) and two interns (PGY1). Residents average approximately 60 hours per week while on service for the rotation which was 1 month in duration.

House Staff are an integral part of the Internal Medicine services at the Phoenix VA. The COVID-19 pandemic created the need for residents to gain exposure to the clinical care of hospitalized COVID-19 patients during an evolving pandemic. The first two months of our COVID-19 inpatient rotation showed that residents can safely be part of the care of COVID-19 positive patients and gain valuable exposure and clinical knowledge.

## PGY - First Place

**First Author: Faraz Damghani, Internal Medicine**

Additional Authors:

Program: UACOM - Phoenix

Title: Rare presentation of Diffuse Large B- cell Lymphoma (DLBCL): Lactic acidosis and Transaminitis

Media Link: [https://www.youtube.com/watch?v=kN\\_LS1Rq2Ow&feature=youtu.be&ab\\_channel=FarazDamghani](https://www.youtube.com/watch?v=kN_LS1Rq2Ow&feature=youtu.be&ab_channel=FarazDamghani)

Abstract: Background:

There are two types of lactic acidosis, one that is due to marked tissue hypoperfusion (Type A), and one that is related to causes other than tissue hypoxia (Type B). This case highlights a case of Type B lactic acidosis, a rare presentation of DLBCL.

Case:

A 68-year-old Hispanic male with a history of Diabetes Mellitus 2 (on sitagliptin and metformin, glyburide, and metformin) initially presented to his PCP with a one month history of generalized fatigue, weakness, and 20 pound unintentional weight loss. Over the next 8 hospital days he had worsening lactic acidosis, up trending PT/INR, negative imaging, and increasing bilirubin concerning for liver failure. He was started on renal replacement therapy (RRT) on hospital day 5 for presumed metformin associated lactic acidosis (MALA), and had an ultrasound guided liver biopsy on day 6 of his hospital stay for urgent liver transplant. He started having respiratory distress on hospital day 7, was intubated, and his lactic acidosis continued to rise despite renal replacement therapy in addition to antibiotic therapy with doxycycline, ceftriaxone, and Levaquin. On day 8 of the hospital stay family decided move towards comfort care. After the patient expired, liver biopsy results came back as diffuse large B-cell lymphoma, activated B-cell subtype.

Discussion:

In this case study there was concern of type b lactic acidosis due to MALA. MALA should be suspected in any patient who has all 5 criteria including (1) a history of metformin administration; (2) a markedly elevated lactate level (>15mmol/L) with a large anion gap (>20mmol/L); (3) severe acidemia (pH 7.1); (4) a very low serum bicarbonate level (<10mmol/L); and (5) a history of renal insufficiency (cr >2.0). In regards to our patient, he only met 3 of the 5 criteria for MALA, but given his negative laboratory work up, and imaging he was presumptively diagnosed with MALA. It was only after liver biopsy for possible liver transplantation that the diagnosis of DLBCL was discovered. Lactic acidosis in malignancies appear to be a marker of poor prognosis. Although poorly understood, lactic acidosis in malignancies occurs because decreased hepatic clearance of lactic acidosis, thiamine deficiency, or increased production of lactic acidosis by the tumor cells via anaerobic glycolysis. Thiamine is an important cofactor in the pyruvate dehydrogenase complex, and deficiency in thiamine leads to more anaerobic metabolism of pyruvate.

Conclusions:

This case emphasized that we need to keep a broad differential when it comes to elevated lactic acidosis, considering hematological malignancies such as DLBCL. Although more data is needed to create treatment protocols. Swift diagnosis and treatment of the underlying malignancy and thiamin administration can be lifesaving .

## [PGY-1 Second Place](#)

**First Author: Sasikanth Ravi, Internal Medicine**

Additional Authors: Sasikanth Ravi, DO; Tushar Menon, MD; Neha Khan, MD; Sahil Kapur, OMS IV; Michael Castro, MD

Program: Abrazo Arrowhead Campus

Title: Angiosarcoma: Exploring The Diagnostic Challenges of Hemopericardium

Media Link: <https://youtu.be/F7lxvbrRu0E>

Abstract: Introduction:

Primary cardiac neoplasms are rare with an autopsy incidence of 0.001-0.30%, or 1 in every 500 cardiovascular surgical cases, with 75% benign and the remaining 25% malignant. Cardiac angiosarcomas are the most common type and constitute about 30% of such cases. Angiosarcomas are frequently located in the right atrium and can cause symptoms such as chest pain, dyspnea, fatigue, and palpitations. Angiosarcomas can occur in any age group, but are usually in individuals younger than 65. Typically, the cancer is amenable to surgical removal; however angiosarcomas are prone to locoregional recurrence, and have notoriously poor prognosis (3-20 months) with frequent nodal and distant metastases. The purpose of this abstract is to highlight the challenge of diagnosing cardiac angiosarcoma in the presence of recurrent hemopericardium.

Case Presentation:

A 34-year-old woman was hospitalized for persistent retrosternal chest pain with shortness of breath and tachycardia. CTA chest with contrast on 08/18/2020 showed a large pericardial effusion 9.5 cm wide. She had a similar pericardial effusion found incidentally on CT abdomen, 3 months prior, showing large hemopericardium confirmed by echocardiogram. She had an emergent pericardiocentesis that removed 1100 cc of hemorrhagic fluid. Cocksackie IgM and IgG were negative, but because antibody titers were elevated, she was diagnosed with Cocksackie. Cytology of pericardial fluid was negative for malignancy.

Comprehensive laboratory studies including viral, immunological, Cocksackie, TB panels, as well as COVID PCR were ordered and came back negative. TEE on hospital day 2 localized the pericardial effusion to be along the right atrium and right ventricle with suspicion for a thrombus. On hospital day 3, the patient underwent a complex surgery status post subxiphoid pericardial window, right minithoracotomy transthoracic pericardial window and median sternotomy with mediastinal exploration on cardiopulmonary bypass to remove the organized thrombus. On hospital day 8, surgical pathology report showed atypical vascular proliferation in the pericardium and intrapericardial mass with CD 45 positive cellular proliferation. After a cardiac MRI and second opinion from Cleveland Clinic, the patient was diagnosed with angiosarcoma involving the right atrium and extending into the level of the pulmonary outflow tract.

Conclusion:

Although rare, cardiac involvement with recurrent hemorrhagic pericardial effusions can occur secondary to obstruction of right atrium and pulmonary outflow tract from intrathoracic malignancy such as primary cardiac angiosarcoma. In this report, we presented a young woman with pathology confirmed primary cardiac angiosarcoma with a unique presentation of recurrent hemorrhagic pericardial effusions. The purpose of this case report was to summarize our experience with evaluation of recurrent hemopericardium and explore the diagnostic challenge of cardiac angiosarcoma in the adult population. In addition, the case study illustrated the necessity of early diagnosis and optimization of treatment to extend the poor survival rates associated with primary cardiac angiosarcoma.

## [PGY 1- Third Place](#)

**First Author: Jee (Joseph) Kim, MD**

Additional Authors: Kenneth K. Sakata, MD; Maxwell Smith, MD; Natalya Azadeh, MD,

Program: Mayo Clinic Arizona

Title: Robotic-assisted bronchoscopy to diagnose malakoplakia

Media Link: <https://youtu.be/xUIW2sWZPIA>

Abstract: Introduction

Robotic assisted bronchoscopy (RAB) is a novel technology used in this case to diagnose pulmonary malakoplakia.

Case Presentation

A 58-year-old female with a history of orthotopic heart transplant in 2019 on tacrolimus and mycophenolate, bilateral breast cancer in remission, and follicular thyroid carcinoma status-post total thyroidectomy presented to pulmonary clinic for evaluation of an enlarging left upper lobe (LUL) lung nodule.

Two months prior, she was diagnosed with RSV pneumonia. A chest computed tomography (CT) at that time found a 16-mm LUL pulmonary nodule that was abutting the mediastinum. A chest CT five weeks later showed that the nodule increased to 20-mm. Ten days prior to her second chest CT, she was diagnosed with an Escherichia coli urinary tract infection. The pulmonary nodule differential diagnosis included post-transplant lymphoproliferative disorder, recurrent breast cancer, primary lung cancer, metastatic follicular thyroid carcinoma and atypical infection. Given the location of the nodule, RAB was used to biopsy the lesion.

Using the Monarch robotic platform, the bronchoscope was navigated to within a few millimeters of the target nodule. Direct visualization in the airway showed a cavitory nodule. Multiple biopsies of the lesion and a bronchoalveolar lavage (BAL) were performed. The patient tolerated the procedure without complications. The biopsy showed non-necrotizing granulomatous inflammation with histologic features consistent with malakoplakia. The bacterial cultures from the nodule and the BAL grew E. coli. Susceptibilities from the urine and lung samples were identical. She was treated with a 4-week course of amoxicillin-clavulanate. A follow up chest CT showed that the nodule had decreased to 14-mm.

Discussion

Malakoplakia is a rare granulomatous disease often associated with a concurrent E. coli infection in immunosuppressed patients. Treatment involves extended duration of targeted antibiotics. This case highlights the superiority of RAB over conventional bronchoscopy (CB) in making the diagnosis of pulmonary malakoplakia. CT guided biopsy was also considered; however, risk of bleeding and pneumothorax were felt to be too high. A last resort would have been surgical resection.

We used RAB to navigate out to the 20-mm peripheral nodule. We achieved this by creating over a 270 degree turn of the robotic arm, which would have been impossible with CB. Our ability to directly visualize the target nodule negated the need to confirm the location with a radial probe ultrasound image. In the literature, a retrospective study with RAB showed promising diagnostic yield of 93%, compared to 30-70% with CB.

Conclusion

Determining a tissue diagnosis with a lung biopsy was imperative in this case due to the rapidly enlarging nodule and the patient's underlying history of cancer and immunosuppression. RAB proved to be superior to other biopsy techniques due to its ability to reach the lesion with minimal risks.

## Medical Students – First Place

**First Author: Lauren Miranda-Cacdac, DO**

Additional Authors: David Baltazar, D.O.; Lydia Shedlofsky, D.O., M.S.MedEd; Christine Lin, M.D.

Program: ATSU-SOMA

Title: Angioimmunoblastic T-cell Lymphoma (AITL) Mimicking a Drug Eruption

Media Link: <https://youtu.be/hCs8PnlYp0g>

**Abstract:** Angioimmunoblastic T-cell lymphoma (AITL), an aggressive form of lymphoma, predominantly occurs in middle-aged to elderly patients and is characterized by generalized lymphadenopathy, hepatosplenomegaly, immunologic abnormalities, and constitutional symptoms. We present a case of AITL mimicking a drug reaction that progressed to leukocytoclastic vasculitis and necrosed digits.

Our patient was placed on a course of Augmentin after a periodontic procedure. On day three of treatment, the patient developed a diffuse pruritic morbilliform exanthem. Steroids were given - which improved the pruritus - but the exanthem persisted for an additional 6 weeks. He developed new onset night sweats, fatigue, weight loss, and bilateral lower extremity edema before presenting to the hospital with diarrhea and cough. Imaging revealed diffuse lymphadenopathy and splenomegaly. Lymph node biopsy revealed abnormal architecture and tumor cells stained positive for CD3, CD4, CD23. Genetic study was also performed and data was consistent with angioimmunoblastic T-cell lymphoma (AITL), stage III/IV. Chemotherapy treatment with cyclophosphamide, hydroxyrubicin, oncovin, and prednisone was recommended. The patient was scheduled for a bone marrow biopsy and port placement. Prior to initiating recommended therapy, he developed hand swelling, dusky appearing fingertips, bullae, and livedo reticularis on bilateral lower extremities.

Dermatology consultation obtained multiple punch biopsies consistent with a necrotizing vasculitis of the small and medium vessels; staining of abnormal cells was consistent with diagnosis of AITL. With this diagnosis he was given furosemide, enoxaparin, and high dose steroids. No new lesions appeared and his edema began to resolve. Bone marrow biopsy was possible and revealed 50% involvement of AITL. He was cleared to begin CHOP therapy and was discharged with outpatient follow up. During his treatment he has experienced an additional episode of digital necrosis that progressed into painful ulceration and was admitted. At last follow-up, no formal prognostic decisions had been finalized.

AITL predominantly affects older adults with incidence higher in the Asian/Pacific Islander and Hispanic populations. AITL is associated with constitutional symptoms, lymphadenopathy, hepatosplenomegaly, and extranodal presentations, such as cutaneous involvement. Prognosis can vary.

The diagnosis of AITL is generally established through lymph node biopsy and tumor cells express known markers. Morbilliform eruptions are more common, which occurred initially in our patient. These cutaneous eruptions occur after antibiotic exposure and are often misdiagnosed as drug-induced reactions. Histology findings can vary. The rarest form is consistent with vasculitis, as seen in our patient. In previous studies, this finding has been associated with purpuric lesions. In this specific case, the patient presented with a persistent morbilliform eruption that progressed to livedo reticularis, bullae, and vascular complications.

We present this case as a unique disease progression and a novel combination of cutaneous findings in a rare form of malignancy and to encourage a high index of suspicion for common morbilliform exanthems that fail to resolve

## Medical Students – Second Place

**First Author: Mitchell Davis, Medical Doctorate**

Additional Authors: Jafri, Zainab; Shedlofsky, Lydia; Newman, Andrew; Lam, Travis; Mengesha Yebabe

Program: UACOM - Phoenix

Title: A Sweet Presentation of a Bitter Disease: Sweet syndrome associated with Coccidioidomycoses

Media Link: <https://youtu.be/XICMCgVnJyI>

Abstract: Acute Febrile Neutrophilic Dermatitis, also known as Sweet Syndrome, is an uncommon inflammatory disorder. Though the exact etiology is unclear, it has been presented in association with various entities. The majority of cases present following upper respiratory infections or viral gastroenteritis. Other causes include drug-induced reactions, pregnancy-related manifestations, or in association with specific hematologic or solid tumors. Rarely, it has been associated with Coccidioidomycosis, with a literature review revealing very few previous cases.

Here we report two new cases of Coccidioidomycosis-associated Sweet Syndrome in individuals residing in Arizona. Coccidioidomycosis is a prevalent fungus endemic to the Southwestern regions of the United States

## Medical Students – Third Place

**First Author: Aditi Chandra, D.O.**

Additional Authors: Fravor L, Shedlofsky L, Mullen H, Lam TS, Peppo, W

Program: Midwestern University

Title: Cutaneous Cryptococcus Infection in an Immunocompetent Patient

Media Link: <https://youtu.be/8ZChzcdo6TE>

**Abstract:** Cryptococcus spp. are basidiomycetous yeasts responsible for a wide range of systemic and cutaneous fungal infections. The most common pathogens that cause infection are *C. neoformans* and *C. gattii*. Meanwhile, the non-*neoformans* species, *C. laurentii* and *C. albidus*, rarely cause infection. However, over the last 40 years, there has been an increase in the number of *C. albidus* infections reported including, keratitis, pneumonia, fungemia, disseminated and cutaneous infections. We present, what is to our knowledge, the fifth case of primary cutaneous Cryptococcus infection due to *C. albidus*. A 53-year old male with a medical history significant for deafness, end-stage renal disease, depression, anxiety, and bipolar disease, presented with a poorly-defined, dusky pink plaque with overlying blisters and crust on the right wrist and forearm. The patient admits to living in unsanitary conditions, which may have included insects, mice, and rats. Laboratory results were negative for HIV, coccidioidomycosis, syphilis, hepatitis, and tuberculosis. The biopsy of the lesion pseudoepitheliomatous hyperplasia with dermal suppurative granulomatous inflammation and positive *C. albidus* growth. Due to the worsening and refractive nature of the infection, the patient was admitted for intravenous (IV) medications and further testing with infectious disease. The patient was started on IV amphotericin B and ampicillin/sulbactam and discharged with an 80-day course of fluconazole 400mg daily and a 2-week Augmentin course. *C. albidus* is a non-*neoformans*, encapsulated, spherical yeast of the Cryptococcus genus. It is a rare pathogen, generally regarded as saprophytic and non-infectious to humans. *C. albidus* is found throughout our environment in the air, soil, food, animal excretions, and even colonized on humans. There have been only 13 previously reported cases in which the yeast has been isolated, four of which have caused a primary cutaneous infection. Immunodeficiency, septicemia, and systemic corticosteroid use are known to increase susceptibility to the cryptococcus infection. This case demonstrates that living conditions may be a causative factor in the susceptibility of developing a cryptococcus infection. The mainstay of treatment for systemic cryptococcus is a combination therapy of IV amphotericin B and flucytosine, followed by a minimum of an 8-week course of fluconazole. To the best of our knowledge, this is the fifth reported case of cutaneous infection with *C. albidus*. This case illustrates the importance of histological analysis and cultures of any atypical or non-healing lesion.