Conclusion: ID is nearly universally involved in the care of patients with DUA-IE, but this patient population requires input from numerous sub-specialties. Multidisciplinary care teams provide a promising framework for DUA-IE to enhance and integrate nuanced decision-making.

Disclosures: **Sarah E. Wakeman, MD**, **Celero Systems** (Advisor or Review Panel member)**Optum Labs** (Grant/Research Support)**UpToDate** (Other Financial or Material Support, Author)

710. Non-invasive Diagnosis of Whipple Endocarditis Using Next-Generation Sequencing for Microbial Cell-free DNA in Plasma

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Session: P-28. Endocarditis

Background: *Tropheryma whipplei* is a gram-positive bacillus that causes Whipple's disease, a protean multisystemic syndrome classically characterized by arthralgias, chronic diarrhea, malabsorption, and weight loss. *T. whipplei* infection has a wide spectrum of clinical manifestations including pleuropulmonary disease, skin hyperpigmentation and cardiac infection. Endocarditis has been diagnosed in a small number of patients and may represent an atypical presentation of *T. whipplei* infection. Diagnosis can be challenging and has typically been accomplished with histopathology on resected valvular tissue or GI tract biopsy. Next-generation sequencing (NGS) of microbial cell-free DNA (mcfDNA) in plasma offers a rapid, non-invasive means of diagnosis of this rare cause of culture-negative endocarditis and challenging clinical entity.

Methods: McfDNA analysis was performed in a patient with culture negative endocarditis. McDNA was extracted from plasma and NGS was performed by Karius, Inc. (Redwood City, California). Human sequences were removed and remaining sequences were aligned to a curated database of over 1,400 pathogens. Organisms present above a predefined statistical significance threshold were reported and quantified in DNA molecules per microliter (MPM). Chart review was performed for clinical correlation.

Results: A 64 year-old male with history of valve replacement presented with significant deterioration of the mitral valve. An exhaustive infectious workup including blood cultures was negative. Karius testing detected *T. whipplei* at 766 MPM within two days of sample receipt. The normal range for *T. whipplei* is 0 MPM based on a cohort of 684 healthy individuals. Blood PCR for *T. whipplei* was confirmatory.

Table 1: Clinical Parameters of Case

Clinical Parameters of Case of *T. whipplei* infection diagnosed by NGS of mcfDNA from plasma:	
Age	64
Male	Male
Presenting symptoms	Exertional dyspnea
Antecedent symptoms	None
Tmax/Fever at presentation	99.8 was Tmax. Otherwise afebrile
Hgb/Hct	8.3/27.5
WBC with %N	8.7 with 83%
Platelets	188,000
PT/PTT	INR 3.3 PT 33.2 No PTT
ESR mm per hr/CRP md per dL	ESR 49 CRP not done
Albumin	3.8
Blood culture result(s)	9 sets all negative
Sites/organ systems involved:	
Joint	none
Diarrhea/abdominal pain/malabsorption/weight loss	none
Central nervous system/ocular	none
Heart	mitral valve degeneration/regurgitation
Skin	none
Pulmonary	none
Systemic	none
Imaging results	CT chest/abd/pelvis showed pulmonary edema and was otherwise negative
Empiric antibiotics	
Antibiotic pretreatment duration prior to Karius Test	vancomycin/ceftriaxone for 4 days
Choice of antibiotics after Karius Test	ceftriaxone/moxifloxacin
Karius Test result	*Tropheryma whipplei* 766 MPM RR (0 MPM)
Karius Test turnaround time from sample receipt	46 hours
Other infectious disease testing, result and turnaround time:	
***T. whipplei* blood PCR (ARUP)**	Positive, turnaround time 37 days
***Histoplasma* and *Blastomyces* antigens, CF and ID antibodies, Fungitell assay, *Coxiella* serology, *Bartonella quintana* PCR, *Brucella* antibodies, *Legionella* antibody, *Rickettsia* antibodies, Blood PCR for CMV, EBV and BKV**	All negative

MPM – molecules of microbial cell-free DNA/microliter
RR – reference range based on the 97.5th %ile in a cohort of healthy individuals

Conclusion: NGS for mcfDNA in plasma offers a rapid, non-invasive method for identifying *T. whipplei* and, to our knowledge, the first diagnosis of Whipple disease using NGS of plasma mcfDNA.

Disclosures: Christiaan R. de Vries, MD, PhD, Karius (Consultant, Independent Contractor)Stanford University (Employee) Ann Macintyre, DO, Karius (Employee)

711. Rapid, non-invasive detection and monitoring of *Bartonella quintana* endocarditis by plasma-based next-generation sequencing of microbial cell-free DNA

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Session: P-28. Endocarditis

Background: There are up to 50,000 new cases of infective endocarditis each year in the United States, of which approximately 20% are culture negative endocarditis (CNE). In-hospital mortality remains high at 20 to 30%. Despite advances in diagnostic testing, determining the timing of surgery and duration of treatment in CNE are significant challenges for clinicians. Plasma next-generation sequencing (NGS) for circulating microbial cell-free DNA (mcfDNA) has shown utility in diagnosing and monitoring the response to treatment in endocarditis.

Methods: Serial blood samples were obtained prior to and after aortic valve replacement in a patient with culture negative endocarditis. Microbial cfDNA was extracted from plasma and NGS was performed by Karius, Inc. (Redwood City, California). Human sequences were removed and remaining sequences were aligned to a curated database of over 1,400 pathogens. Organisms present above a predefined statistical significance threshold were reported and quantified in DNA molecules per microliter (MPM). Chart review was performed for clinical correlation.

Results: A 53-year old man with history of homelessness, well-controlled HIV infection and a bioprosthetic aortic valve presented with symptomatic severe aortic stenosis and elevated inflammatory markers 3 years following valve surgery. Transesophageal echocardiography showed a paravalvular leak. *Bartonella quintana* was detected by Karius NGS (in parallel *Bartonella henselae* serologies were positive). After 4 weeks of parenteral antibiotics, repeat Karius testing demonstrated a 94% (16-fold) decrease in the *Bartonella quintana* mcfDNA signal to 8813 MPM. He underwent surgical valve replacement; twenty-four hours after removal of the infected valve repeat Karius testing showed a rapid decay of the *Bartonella quintana* mcfDNA signal to 103 MPM. The patient completed 3 months of oral antibiotics post-operatively, ultimately returning to his former performance status.

Conclusion: Plasma-based next-generation sequencing assays for circulating microbial cell-free DNA offer a unique means of pathogen detection, assessment of infection burden and monitoring of response to both medical treatment and surgical debridement/definitive source control in a case of *Bartonella quintana* endocarditis.

Disclosures: Asim A. Ahmed, MD, Karius (Employee)

712. Risk of Infective Endocarditis after Transcatheter Aortic Valve Replacement in Patients with Bloodstream Infection: A Population-Based Study

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Session: P-28. Endocarditis

Background: Transcatheter aortic valve replacement (TAVR) was initially approved as an alternative to surgery for patients at high surgical risk. However, it is now being considered for patients with intermediate and low surgical risk. This will result in the expansion of patient pool for TAVR; hence it is of interest to ascertain risk of blood stream infection (BSI) and infective endocarditis (IE) following TAVR. We aim to study the incidence, epidemiology and risk factors associated with IE in patients who underwent TAVR and subsequently developed a BSI.

Methods: A population-based study was conducted in 7 counties in southeastern Minnesota using the expanded Rochester Epidemiology Project (E-REP) for all adult (≥18 years) patients who underwent TAVR from January 1st, 2010 to December 31st, 2018. Transcatheter procedures that included replacement of either the aortic or mitral valve were included. Medical records were screened for development of BSI from time of TAVR until May 15th, 2020. Patients were classified as having BSI only, BSI with IE at outset, or BSI with subsequent development of new IE. 'Early' IE was defined as that occurring < 12 months following TAVR, with subsequent cases defined as 'late' IE.

Results: A total of 247 patients underwent TAVR during the study period. There were 24 patients with of BSI and 10 (42%) developed IE with an annual incidence of 5 per 1000 persons-years. Median age for patients who developed IE was 85.4 years. Male gender was affected predominantly (70%). Six developed IE at outset of BSI, while four developed IE subsequent to IE. The median time to development of IE was 791 days following TAVR. There was an equal number of early and late IE cases (n=5). The most common pathogen causing IE was viridians group streptococci (n=4) followed by enterococci and coagulase-negative staphylococci with 2 patients each. Mean Charlson comorbidity index was 6.6. Two patients with IE died before resolution of infection (20%).

Conclusion: The incidence of BSI and subsequent IE in patients with TAVR was low in our population. Due to the small number of BSI and IE cases, statistical analysis was not feasible. An analysis of all cases seen at Mayo Clinic is planned since the number of cases would be much higher to investigate potential risk factors associated with BSI and IE.

Disclosures: Larry M. Baddour, MD, Boston Scientific (Consultant) M. Rizwan Sohail, MD, Aziyo Biologics (Consultant)Medtronic Inc (Consultant, Research Grant or Support)

713. The Clinical Impact of Implementation of a Multidisciplinary Endocarditis Team

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Session: P-28. Endocarditis

Background: Infectious endocarditis is associated with substantial in-patient mortality of 15-20%. Effective management requires coordination between multiple medical and surgical subspecialties which can often lead to disjointed care. Previous European studies have identified multidisciplinary endocarditis teams as a tool for reducing endocarditis mortality.

Methods: The University of Michigan Multidisciplinary Endocarditis Team was formed on May 3rd, 2018. The group developed an evidence-based algorithm for management of endocarditis that was used to provide recommendations for hospitalized patients over a 1-year period. Mortality outcomes were then retroactively assessed and compared to a historical control that was identified using an internal research tool.

Figure 1

Figure 2. Study enrollment flowchart

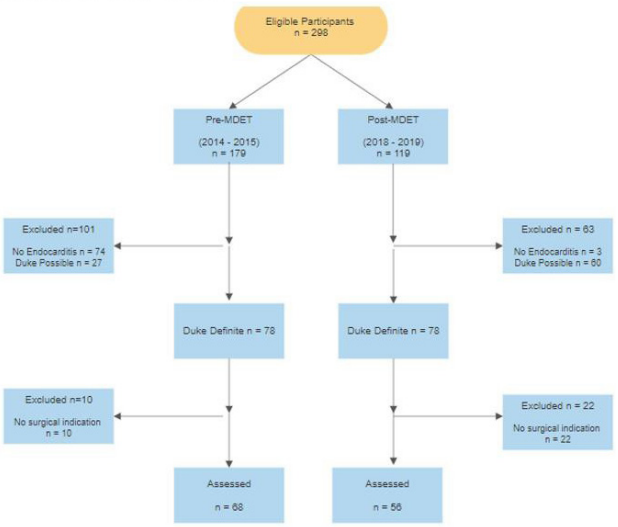

Table 1

Table 1. Characteristics of patients with definite and endocarditis and surgical indications in the period before (2014-2015) and after (2018-2019) implementation of the multidisciplinary endocarditis team. (Abbreviations: OSH = Outside Hospital), IV = Intravenous, ESRD = End-Stage Renal Disease, CIED = cardiac implantable electronic device, ICU = Intensive Care Unit, STS = Society of Thoracic Surgeons)

Variable	2014-2015 (n = 68)	2018-2019 (n = 56)	P-value
Average Age (years)	57.5	50.7	0.02
Male Gender, % (n)	60.3 (41)	62.5 (35)	0.80
OSH Transfers, % (n)	65.7 (44)	60.7 (34)	0.57
Average Days to Transfer	8.5	8.7	0.90
IV Drug Use, % (n)	14.7 (10)	14.3 (8)	0.95
Diabetes	26.5 (18)	16.1 (9)	0.16
ESRD	16.2 (11)	14.3 (8)	0.77
Acute Renal Failure	16.2 (11)	0 (0)	0.002
Prosthetic Valve, % (n)	51.5 (35)	28.6 (16)	0.01
Presence of CIED, % (n)	13.2 (9)	12.5 (7)	0.91
Aortic Valve Involvement	52.9 (39)	57.1 (32)	0.64
Mitral Valve Involvement	42.6 (29)	44.6 (25)	0.82
ICU Admission, % (n)	48.5 (33)	64.3 (36)	0.08
Vasopressor Requirement, % (n)	34.3 (23)	39.3 (22)	0.57
Mechanical ventilation, % (n)	29.9 (20)	55.4 (31)	0.004
Heart Failure from IE, % (n)	48.5 (33)	50.0 (28)	0.87
IE Complicated by Heart Block/Abscess, % (n)	26.5 (18)	23.2 (13)	0.67
Persistent Bacteremia, % (n)	7.4 (5)	16.1 (9)	0.13
Recurrent Emboli, % (n)	42.6 (29)	26.8 (15)	0.07
Vegetation >10 mm, % (n)	29.4 (20)	32.1 (18)	0.75
Mean STS Risk Score, %	11.8	9.8	0.40

Results: Between June 14th, 2018 and June 13th, 2019 the team provided guideline-based recommendations on 56 patients with Duke Criteria definite endocarditis and at least 1 American Heart Association indication for surgery. The historical control included 68 patients with definite endocarditis and surgical indications admitted between July 1st, 2014 to June 30th, 2015. In-hospital mortality decreased significantly from 29.4% in 2014-2015 to 7.1% in 2018-2019 (p< 0.0001). There was a non-significant increase in the rate of surgical intervention after implementation of the team (41.2% vs 55.4%; p=0.12).

Table 2

Table 2. Microbiologic diagnoses for patients with definite endocarditis and surgical indications during the periods prior to and after implementation of the multidisciplinary endocarditis team. (Abbreviations: MSSA = Methicillin Susceptible *Staphylococcus aureus*, MRSA = Methicillin Resistant *Staphylococcus aureus)*

Microorganism	2014-2015 (n = 68)	2018-2019 (n = 56)	P-Value
MSSA, % (n)	14.7 (10)	26.8 (15)	0.10
MRSA, % (n)	10.3 (7)	10.7 ((6)	0.94
Coagulase Negative *Staphylococcus*, % (n)	10.3 (7)	5.4 (3)	0.32
Viridans *Streptococcus*, % (n)	17.6 (12)	23.2 (13)	0.44
Group B *Streptococcus*, % (n)	4.4 (3)	5.4 (3)	0.80
Enterococcus, % (n)	10.3 (7)	10.7 (6)	0.94
Fungal, % (n)	10.3 (7)	1.8 (1)	0.06
Polymicrobial, % (n)	8.8 (6)	3.6 (2)	0.24
Culture Negative, % (n)	4.4 (3)	5.4 (3)	0.80
Other, % (n)	8.8 (6)	7.1 (4)	0.73

Table 3

Table 3. Clinical and mortality outcomes of patients in the periods prior to and after implementation of the multidisciplinary endocarditis team.

Variable	2014-2015	2018-2019	P-value
Documented Cardiac Surgery Consultation, % (n)	75 (51)	83.9 (47)	0.23
Patients Managed Surgically, % (n)	41.2 (28)	55.4 (31)	0.12
Average Time to Cardiac Surgery Consultation (days)	7.1	2	<0.0001
Average Time from Admission to Surgery (days)	14	11.4	0.29
Average length of stay (days)	18	24.7	0.03
Overall In-hospital mortality, % (n)	29.4 (20)	7.1 (4)	<0.0001
Medical Management In-Hospital Mortality, % (n)	45 (18)	16 (4)	0.02
Surgical Management In-Hospital Mortality, % (n)	7.1 (2)	0 (0)	0.13

Table 4

Table 4. Number and types of changes to patient care plans recommended by the Multidisciplinary Endocarditis Team. (Abbreviation: TEE = transesophageal echocardiography)

Change in Plan of Care	Proportion of case (n=56)
Any change	83.9 (47)
Change in antibiotic plan	62.5 (35)
Change in surgical planning	21.4 (12)
Recommended TEE	16.1 (9)
Recommended additional neurologic imaging	7.1 (4)
Recommended additional infectious work-up	7.1 (4)
Recommended other additional diagnostic imaging	23.2 (13)

Conclusion: Implementation of a multidisciplinary endocarditis team was associated with a significant 1-year decrease in all-cause in-hospital mortality for patients with definite endocarditis and surgical indications. In conjunction with previous studies demonstrating their effectiveness, this data supports that widespread adoption of endocarditis teams in North America has the potential to improve outcomes for this patient population.

Table 5

Table 5. Predictors of in-hospital mortality in patients with definite endocarditis and surgical indications in the years 2014-2015 and 2018-2019.

Variable	Estimate	Standard Error	Z-Value	P-Value
Age	-0.0237	0.018	-1.62	0.11
Gender	-1.055	0.582	-1.81	0.07
Diabetes	-1.210	0.572	-2.12	0.03
Prosthetic Valve	-0.754	0.526	-1.43	0.15
Heart Failure	-0.956	0.521	-1.83	0.07
Vasopressor	0.37	0.735	0.50	0.51
Mechanical Ventilation	-0.587	0.721	0.82	0.42
ICU Admission	-1.345	0.803	-1.68	0.09
Year	1.70	0.547	3.28	0.001

Disclosures: **All Authors**: No reported disclosures

714. Increase in Multidrug-resistant Salmonella Serotype I 4,[5],12:i:- Infections Linked to Pork—United States, 2009–2018

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