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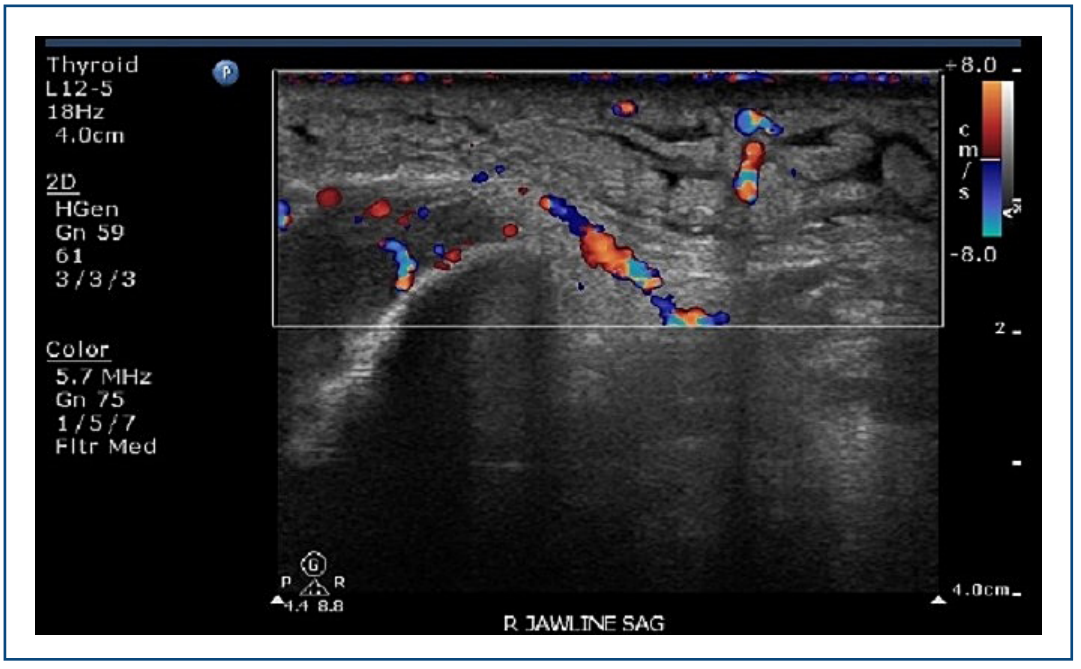

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About the cover

The cover image is Figure 2 that shows the increased vascularity present along the periphery of the irregular, hypoechoic collection noted in the right cheek.

Message from the Editor-in-Chief

Hello all, my name is Amber Javaid, and I am the new Editor-in-Chief. I have worked as a sonographer for the past 20 years and as an education manager for the last 10 years. I am very pleased and thankful to the Sonography Canada Board for trusting my ability to be part of *CJMS*. Sheena Bhimji-Hewitt has been an exceptional editor-in-chief since 2019 and she has done an excellent job and I would like to thank her for her precious time and great efforts. I learned lots of good tips from Sheena and have no doubt that, in the weeks and months ahead, Sheena's guidance will be a big help to me.

I hope to see lots of submissions from all the provinces, and I encourage you to reach out to me or the editorial board if you have an interesting case or a literature review. I want to thank the editorial committee and the reviewers who work hard and are a valuable resource for the journal. To our readers and authors, I thank you for your support and encourage you to submit your evidence-based case reports, research, or professional practice manuscripts to continue to ensure that sonographers are constantly learning and growing in their practice. Together, we can work as a great team!

I plan to add a section called "Images in Sonography." Where members can share an interesting or unique case in a short article of not more than 400 words with images and references.

I will do my best to meet the standard of excellence and keep bringing the great articles you are accustomed to. If you have any suggestions for the topics, you would like to cover, please feel free to contact me.

Enjoy the issue!

Amber Javaid, MSc, CRGS, RDMS, RMSKS, RVT
Editor-in-chief
Sonography Canada
amber.javaid@camiscare.ca

Message de la rédactrice en chef

Bonjour à tous, je m'appelle Amber Javaid et je suis la nouvelle rédactrice en chef. Je travaille en tant qu'échographiste depuis 20 ans et en tant que responsable de la formation depuis 10 ans. Je suis très heureuse et reconnaissante envers le Conseil d'administration de Sonography Canada d'avoir fait confiance à ma capacité à faire partie de la CJMS. Sheena Bhimji-Hewitt est une rédactrice en chef exceptionnelle depuis 2019. Elle a fait un excellent travail et j'aimerais la remercier pour son temps précieux et ses efforts. J'ai appris beaucoup de bons conseils de Sheena et je ne doute pas que, dans les semaines et les mois à venir, les conseils de Sheena me seront d'une grande aide.

J'espère que toutes les provinces nous soumettront de nombreux articles et je vous encourage à me contacter ou à contacter le comité de rédaction si vous avez un cas intéressant ou une revue de la littérature. Je tiens à remercier le comité de rédaction et les évaluateurs qui travaillent dur et constituent une ressource précieuse pour la revue. À nos lecteurs et auteurs, je vous remercie de votre soutien et vous encourage à soumettre vos rapports de cas, recherches ou manuscrits de pratique professionnelle fondés sur des données probantes afin de continuer à garantir que les échographistes apprennent et progressent constamment dans leur pratique. Ensemble, nous pouvons former une grande équipe !

J'ai l'intention d'ajouter une section intitulée "Images en échographie". Les membres pourront y partager un cas intéressant ou unique dans un article court de 400 mots maximum, avec des images et des références.

Je ferai de mon mieux pour respecter les normes d'excellence et continuer à vous proposer les excellents articles auxquels vous êtes habitués. Si vous avez des suggestions de sujets à traiter, n'hésitez pas à me contacter.

Bonne lecture !

Amber Javaid, MSc, CRGS, RDMS, RMSKS, RVT
Rédactrice en chef
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Case Study

Apoorva Chhura, CRGS

A Rare Case of Dental-Related Mandibular Osteomyelitis with a Superficial Phlegmonous Collection

About the Author

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ABSTRACT

Osteomyelitis is a rare inflammatory disease of the bone, with mandibular osteomyelitis being one of its rarest forms. Severe complications such as osteonecrosis, chronic injuries, and permanent disabilities commonly result from this condition. Timely diagnosis and treatment are, thus, critical in preventing such complications. Clinical history, patient symptoms, and diagnostic techniques are all necessary in formulating the diagnosis; however, ultrasound is not one of the imaging modalities typically used for this. The case described in this study is an atypical presentation of osteomyelitis, resulting in the use of ultrasound as a first-line diagnostic technique to narrow the list of possible differentials. The ultrasound findings, in correlation with the patient's clinical history, led to further testing which rapidly helped establish mandibular osteomyelitis as the most probable diagnosis for the patient.

Keywords: Osteomyelitis, dental-related, mandibular osteomyelitis, phlegmonous collection, superficial phlegmonon

Introduction

Osteomyelitis is inflammation of bony tissues which can result in cortical destruction and periosteal reaction.[1,2] For adults, this can lead to complications such as osteonecrosis, septic arthritis, and chronic injuries; for children, it can result in impaired growth, leading to permanent disabilities.[1,2] It is, thus, a serious condition that requires timely intervention to prevent such complications. The most common cause of osteomyelitis is an infection after bone trauma, surgery, or secondary to vascular insufficiency.[1,3] Age distribution of osteomyelitis is bi-modal, with greater prevalence in children younger than 5 and adults older than 50; however, it can affect anyone in any age group.[2,4] The greater prevalence noted in adults is likely due to comorbidities such as diabetes or cardiovascular disorders,[4] while the prevalence

in children may be linked to the increasing burden of methicillin-resistant *Staphylococcus aureus* (MRSA).[1,4] Typically, it is seen in long bones of the extremities for youth and the adults' vertebrae, pelvis, and lower extremities.[4] Cases of osteomyelitis of the jaw, however, are far rarer, making up only about 5% of the annual cases.[4] Better oral hygiene practices, early infection screening, and the discovery of antibiotics have significantly contributed to decreasing the burden of infections in modern medicine.[3–5]

In cases of maxillo-mandibular osteomyelitis, the mandible is more likely to be affected than the maxilla, and a dental origin of infection is the most prevalent.[5] Typical symptoms of mandibular osteomyelitis include fever, malaise, facial cellulitis, trismus (spasm of the jaw muscles causing the mouth to remain tightly closed), and leukocytosis.[6]

Diagnosis is typically made through patient history, clinical examination, and X-ray imaging.[1,7] Other imaging techniques such as computed tomography (CT), scintigraphy, and SPEC/CT can also be used to further localize and characterize osteomyelitis.[1,7] Treatment depends on the severity of the case, but surgery is often necessary to dispose of the necrotic bony tissues.[8]

This study delineates a case of osteomyelitis that presented with atypical symptomology and highlights the necessity of a holistic approach when dealing with an atypical case of disease.

Case

An 89-year-old patient presented to the clinic with persistent swelling along the right jaw and lower portion of the cheek for a week and a half. On visual examination, there was no bruising, erythema, and no history of physical trauma to the cheek or jaw. The patient also denied any pain or tenderness over the area of concern. There was no slurring of speech or impediment in mastication. Further questioning revealed the patient had a dentist appointment 3 weeks ago with no major procedure. There was no history of anticoagulant use.

After informed consent, an ultrasound examination was conducted. The patient was placed supine with the neck extended and slightly turned to the left. The study used a Philips HD-15 ultrasound machine utilizing a linear 12-5 MHz with the thyroid preset.

The study showed an irregularly outlined, heterogeneous, hypoechoic area immediately anterior to the mandible. (Figure 1) The components of the complex collection created low-level echoes but were not mobile. There was little to no internal vascularity; however, the periphery contained increased vascularity in the area. (Figure 2) The overlying skin showed a cobblestone appearance, signifying edema, again with hypervascularity present. (Figures 3 and 4) The collection was contained between the intact masseter muscle anteriorly and the mandible posteriorly. The right parotid and submandibular glands appeared normal, while the adjacent lymph nodes showed some increase in vascularity but otherwise retained a normal appearance.

Given the presence of the collection and overlying edema, despite the lack of overt inflammatory symptoms, a local source of infection was considered, and an x-ray of the mandible was ordered by the reporting radiologist.

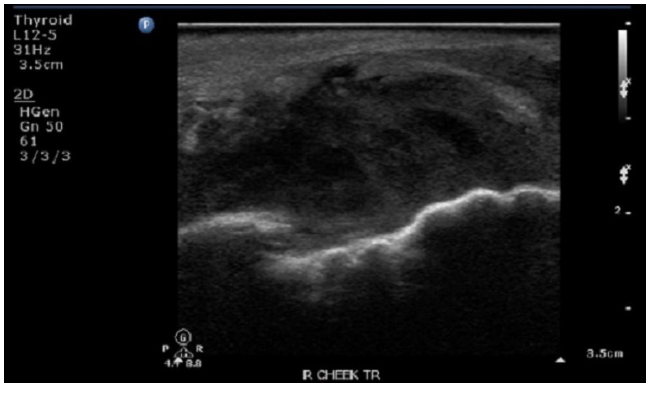

Figure 1. Shows the irregular, hypoechoic collection found between the right mandible and the masseter muscle in the right lower cheek of the patient. This image is oriented long axis to the right mandible.

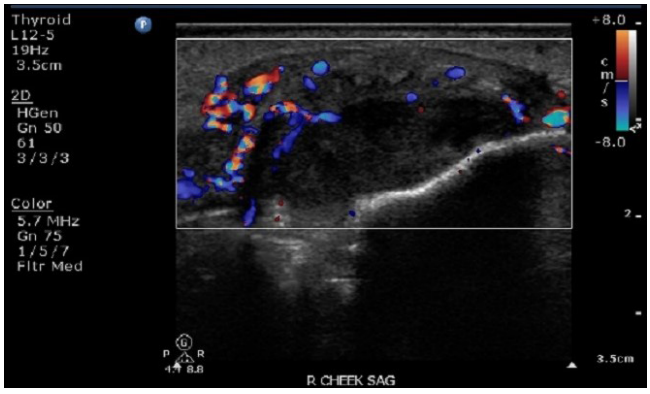

Figure 2. Shows the increased vascularity present along the periphery of the irregular, hypoechoic collection noted in the right cheek.

Figure 3. Highlights the cobblestone appearance of the superficial layers along the affected area of the right cheek, signifying edema. R SUB refers to the right submandibular gland, which can be seen within the image with a normal homogenous echotexture.

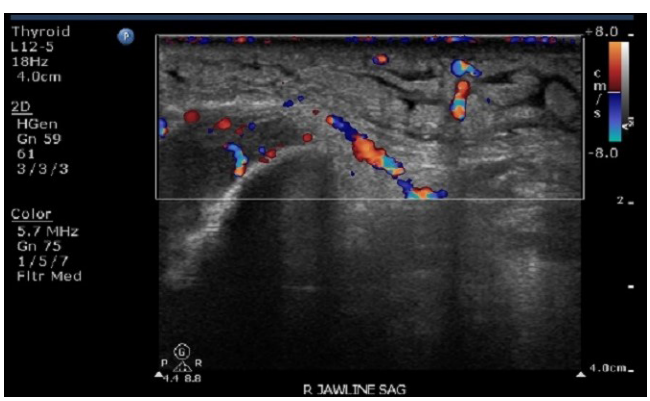

Figure 4. Uses Doppler to show the superficial layers' increased vascularity and edematous appearance.

The x-ray showed mild lucency around the root canal of the posterior-most right molar extending to its deepest tip (Figures 5a and 5b). No cortical destruction or periosteal reaction was noted in the mandible within the x-ray. This suggested a dental-related source of infection that created a complex collection in the right mandibular area.

The patient was referred for further testing by the ordering physician on suspicion of osteomyelitis. A contrast-enhanced CT of the head was conducted. Permeative lucency within the right mandible with accompanying cortical destruction and periosteal reaction was demonstrated. An area of lucency was also identified surrounding the right mandibular molar. The complex collection seen on the ultrasound appeared as a region of phlegmonous soft tissue, signifying a lack of fluid collection in the infected tissue. A whole-body nuclear medicine scan was also conducted with delayed imaging SPEC/CT, which confirmed the presence of hyperemia in the mandible and at the site of the infected tooth.

The presence of hyperemia in the areas of lucency confirmed infection, while CT confirmed the destruction of bony tissue. With lucency and hyperemia also noted in the right mandibular tooth, the final diagnosis supported the clinical suspicion of dental-related mandibular osteomyelitis.

Discussion

As noted earlier, osteomyelitis is a bony tissue infection that can affect any demographic with the leading causes being physical trauma, vascular insufficiency, and contiguous infections. With advancements in antibiotic treatments and infection prevention, the overall incidence of osteomyelitis has decreased over time; however, it still presents as a significant complication given the severity of the disease and the consequences.[1,2,5] Thus, effective prevention is the most efficient method to maintain patient health.

After prevention, the second most important factor in effective treatment is a timely diagnosis of

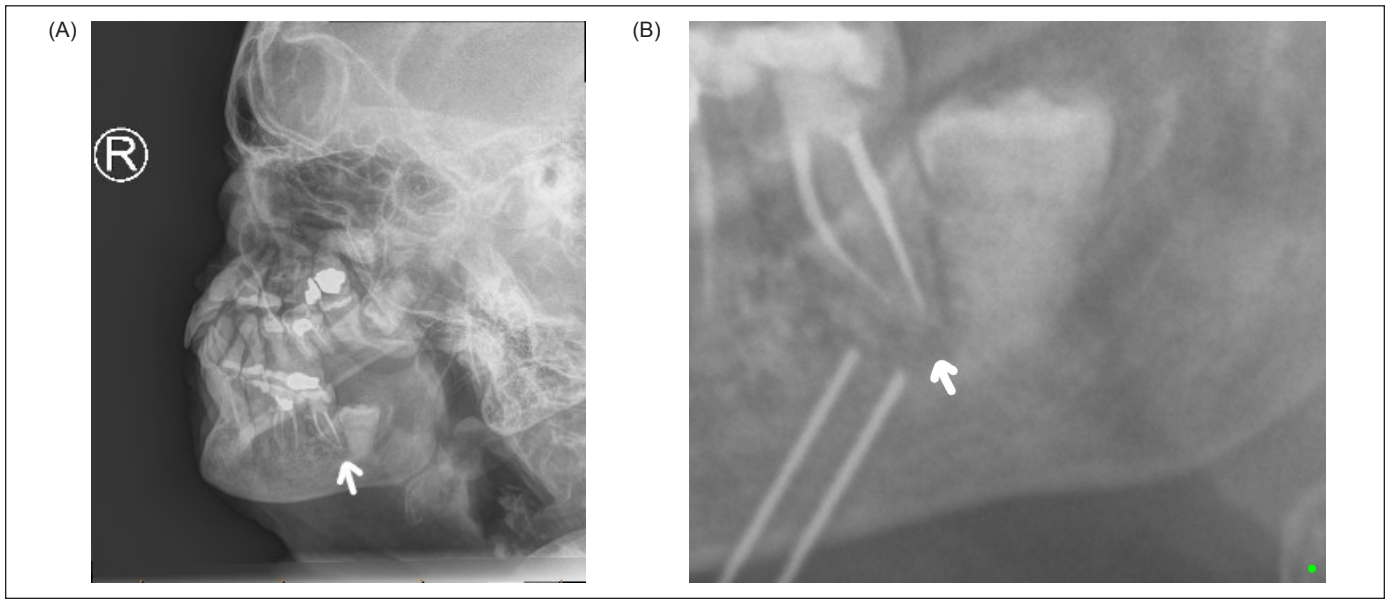

Figure 5. (A,B) show the x-ray of the right mandible and the jaw. The white arrows point towards the lucency noted at the apical tip of the right molar's root canal, which is suspected to be the initial area of infection. (B) it is a simple magnification of the area of concern using the PACS system.

osteomyelitis. This relies on clinical signs and symptoms, laboratory tests, various diagnostic imaging techniques, and histological analysis to determine the presence and severity of the disease. A definitive diagnosis can only be given through a bone biopsy which identifies the etiological pathogen; however, a biopsy is not usually performed until confirmation from other tests.[1,7,8]

Focal and systemic inflammatory symptoms are the first warning signs noted clinically following physical trauma.[6–8] As seen in the case study, not all patients present with the expected range of clinical signs.[6] The symptoms must be placed in the context of patient history, demographics, and comorbidities to fully assess possible diagnoses. If uncertain, preliminary testing with easier access, such as blood tests and ultrasounds, can be performed. Blood tests would look for inflammatory markers such as elevated levels of c-reactive protein or increased erythrocyte sedimentation rate, and although these are non-specific to a disease, they would be able to confirm the presence of inflammation within the body.[7–9]

It should be noted that a compromised immune system can lead to a decreased inflammatory response during infection, so a patient may not always present with the expected physical signs or elevated levels of inflammatory blood markers. Diabetes mellitus, malnutrition, severe anemia, or alcohol abuse are some of the factors that can decrease the effectiveness of immune surveillance and response to infection.[6] Advanced age is another contributing factor in immunocompromise, which may be significant in explaining the muted immune response of the patient in the case study along with other undisclosed medical history.[10]

Although ultrasounds are not typically ordered for cases of osteomyelitis as they have limited utility for bony infections, they can be efficacious in the presence of soft tissue collections or edema. Given the presence of a collection, ultrasound may also be useful for guiding needle aspiration for histological analysis.[1,11,12] This case was unique due to the unusual presentation of symptoms. Osteomyelitis was not initially suspected, and the ultrasound was ordered to determine the presence

of an abnormality (such as an infected lymph node) that would lead to swelling of the cheek and jaw. In the context of the patient's demographics and history, the exam results led to the suspicion of a contiguous infection in the jaw, and an x-ray of the mandible was ordered.

X-ray is a common diagnostic tool for detecting bony abnormalities and is a staple for the initial osteomyelitis workup.[1,7] In this case, it should be noted that the initial x-ray of the mandible did not show any signs of cortical destruction or periosteal reaction despite later confirmation with CT and SPEC/CT. Bone destruction in osteomyelitis begins from the marrow outwards, and a reduction of at least 30% in mineral content of the bone is required for it to be detectable on an x-ray.[13,14] Thus, the x-rays may appear normal up to 2-3 weeks from symptom onset. It is estimated that up to 80% of the patients presenting for an x-ray within the first two weeks of infection will have a negative test.[1,11] If there is high suspicion of osteomyelitis despite a negative x-ray, other scans such as MRI, SPEC/CT, and scintigraphy can be used to confirm the presence and location of the infection.

Diagnostic exams such as MRIs, CT scans or nuclear medicine scans (scintigraphy) have a higher specificity and sensitivity for osteomyelitis than x-rays.[1,13] Each can provide confirmation of presence and location of the infection[1,13]; however, contraindications and limitations of the tests need to be kept in mind to determine the best course of workup for any individual. For example, although MRI has very high sensitivity for osteomyelitis and can detect even early infections, it is contraindicated if the patient has a pacemaker or intracranial aneurysm coils. Furthermore, MRI facilities are limited and may not be easily accessible.[1] CT scans, on the other hand, are more accessible and even better at resolving bony tissues than MRIs, but they have limited resolution of soft tissues and are, thus, unable to exclude early infections.[1,15] Multiple exams can also be conducted (or hybridized, such as SPEC/CT) and compiled to delineate all aspects of the disease.[1,13]

All information gathered from the diagnostic tools is necessary to determine the best course of treatment for the individual patient. Based on the characteristics of the inflammation and the patient's demographics, the treatment plan may vary from conservative antibiotic therapy to surgical debridement. Typically by the time of diagnosis, the infection will have progressed enough to require surgical debridement; however, some patients, such as older adults, may not tolerate such intensive procedures and may require more conservative treatment. Thus, treatment plans are dependent on several factors: mode of infection (hematogenous, contiguous), length of infection, spread of the inflammation, and the patient's overall health. Optimal results are contingent on a timely diagnosis to minimize the damage and the recovery time.[7,8]

Conclusion

Inflammatory diseases such as osteomyelitis often present with prominent symptoms. They are not directly diagnosable through one test, but through considering the history, symptomatology, and diagnostic testing. These cases are not often seen as ultrasound patients; typical diagnostic testing includes x-rays, CT, MRI, and scintigraphy. However, with an atypical presentation of such disease, an ultrasound may be initially recommended to characterize the issue. Thorough history acquisition and awareness of possible diagnoses is required for reference to further testing leading to timely diagnosis and treatment for the best outcome for the patient.

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Article Title: A Rare Case of Dental-Related Mandibular Osteomyelitis with a Superficial Phlegmonous Collection

Authors' Names: Apoorva Chhura, CRGS

1. If an x-ray is negative for osteomyelitis, then, regardless of history and clinical signs, a diagnosis of osteomyelitis can be ruled out.

A. True
B. False

2. Typical symptoms of mandibular osteomyelitis include:

A. Trismus, fever, erythema
B. Lymphocytosis, malaise, reverb
C. Fever, cough, headache
D. Toothache, bleeding gums, decreased appetite

3. The most common site of osteomyelitis is:

A. Skull for children; pelvis for adults
B. Maxilla for children; mandible for adults
C. Extremities for children; pelvis for adults
D. Extremities for children; ribs for adults

4. Treatment for osteomyelitis includes:

A. Antibiotic therapy
B. Surgical debridement
C. All of the above
D. None of the above

5. Computed tomography is the best method of diagnosis for osteomyelitis.

A True
B. False

Alana Currie, CRGS, CRCS

The Effect of Vegetation Size on Mortality in Intravenous Drug Users with Right-Sided Infective Endocarditis: A Systematic Review

About the Author

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ABSTRACT

Background

Intravenous drug use is a significant precursor for infective endocarditis (IE), a potentially lethal infection that affects the endocardial layer of the heart. Several clinical and echocardiographic parameters have been used as prognostic factors to guide IE treatment. Though many studies have investigated vegetation size (VS) as a predictor of mortality in the general population, few have examined this relationship specifically in intravenous drug users (IVDUs).

Purpose

To determine the effect of VS on in-hospital mortality in IVDUs with right-sided IE.

Methods: The author conducted a systematic review of retrospective studies that investigated IVDUs with right-sided IE and specifically addressed the relationship between VS and mortality in this population.

Results

A systematic search of four databases identified three studies that sufficiently addressed the research question. Across these studies, it was found that VS >20 mm is a significant predictor of mortality for IVDUs with right-sided IE.

Conclusion

Given the heightened mortality rates associated with vegetations >20 mm, further consideration should be given to using VS >20 mm as a surgical indication for IVDUs with right-sided IE.

Keywords: Endocarditis, intravenous drug users, IV drug users, intravenous drug abuse, injection drug users, injection drug use, vegetation, mortality

Introduction

Infective endocarditis (IE) is a complex and potentially lethal infectious disease that affects the endocardial layer of the heart.[1] In recent decades, there has been a marked shift in the risk factors for IE, with intravenous drug use representing the single largest predisposing factor in right-sided IE.[2] Infective endocarditis amongst IVDUs has a unique clinical presentation, with differing microbiology, involvement of cardiac valves, and prognosis than IE in the general population.[3,4] In IVDUs, IE typically involves the tricuspid valve (58-80%) with *Staphylococcus aureus* being the most common causative agent.[2,4] In addition, the prognosis of IE in IVDUs is generally more favourable than that in non-drug users, with the mortality rate ranging from 5–10%.[5]

Echocardiography is central to diagnosing and managing patients with IE, with vegetation identification through echocardiography being a major criterion for diagnosing IE using the Modified Duke Criteria.[1] On ultrasound, vegetations appear as distinctly-shaped masses that are adherent to a cardiac structure but display independent motion.[6] They represent a high concentration of micro-organisms that destroy the valve leaflet/(s) and may preclude antibiotic penetration.[5] Although the prognostic value of VS remains controversial, the American Heart Association's most recent guidelines state that surgical intervention in right-sided IE is reasonable when tricuspid valve vegetations exceed 20 mm.[1] However, it is important to note that these guidelines are not specific to IVDUs, and therefore other factors unique to this population must be considered.[2] Some of these challenges include long-term use of intravenous catheters, social challenges, poor adherence, and continued risk of intravenous drug use.[2]

Despite how several echocardiographic and clinical parameters have been used to predict outcome, guide medical therapy, and determine the need for surgical intervention, the exact predictors for poor outcome or the need for surgical interventions are not clearly defined in IVDUs.[4] Therefore, The research question for this systematic review is as follows: "For IVDUs with right-sided IE, what is the effect of VS on in-hospital mortality?"

Methods

Information sources

The protocol for this systematic review for submitted for review with PROSPERO on February 1st, 2020 (registration number CRD42020167589). Articles were extracted by hand from the following four databases: PubMed, CINAHL, Embase and Cochrane Library. The 2015 European Society of Cardiology (ESC) Guidelines for the Management of Infective Endocarditis and the American Heart Association guidelines for Infective Endocarditis in Adults were also consulted.[1,11] The final search for this systematic review was conducted on February 23rd, 2020.

Search Strategy

The key search terms used for the systematic search include the following: *endocarditis, intravenous drug users, IV drug users, intravenous drug abuse, injection drug users, injection drug use, vegetation, and mortality*. As shown above, variations of terms to describe "IVDUs" were included using the Boolean operator OR in each database to ensure that the search generated all articles that studied this population. No limits were placed on text availability, article types or publication status. However, where applicable, limits were set to only include English articles that studied human subjects and were published between 2005–2020.

Results

Study Selection

Through the aforementioned literature search, 64 unduplicated records were retrieved (see Figure 1). Of these, 51 were immediately excluded during the initial screening of titles due to non-relevance to the research question. This left 13 articles, in which the titles and abstracts were further assessed for eligibility. Of these 13 articles, exclusion criteria included: lack of information pertaining to VS (n=3), non-relevance to IVDUs (n=1), insufficient data on right-sided IE (n=1) and lack

of generalizable findings due to case study design (n=1). This left seven articles for which each text was thoroughly assessed for eligibility. Upon full-text examination of the remaining articles, it was determined that only three of them contained sufficient data to appropriately address the research question. One study appeared very promising[4]; however, unfortunately the authors did not respond to a request to share their data regarding the prevalence of mortality with vegetations <1 cm in only cases of right-sided IE, as opposed to both left and right-sided cases. The mortality rate of right-sided IE could not be extracted using the bar charts and percentages provided, and thus, inconsistencies and insufficient data precluded this study's utility for this review.[4] Accordingly, only three publications were included.[5,14,15]

Characteristics of studies

Three publications were ultimately included in this systematic review[5,14,15] which all investigated the relationship between VS and mortality in IVDUs (see Table 1). The studies were published between 1992 and 2016, with data from 1978 to 2011.

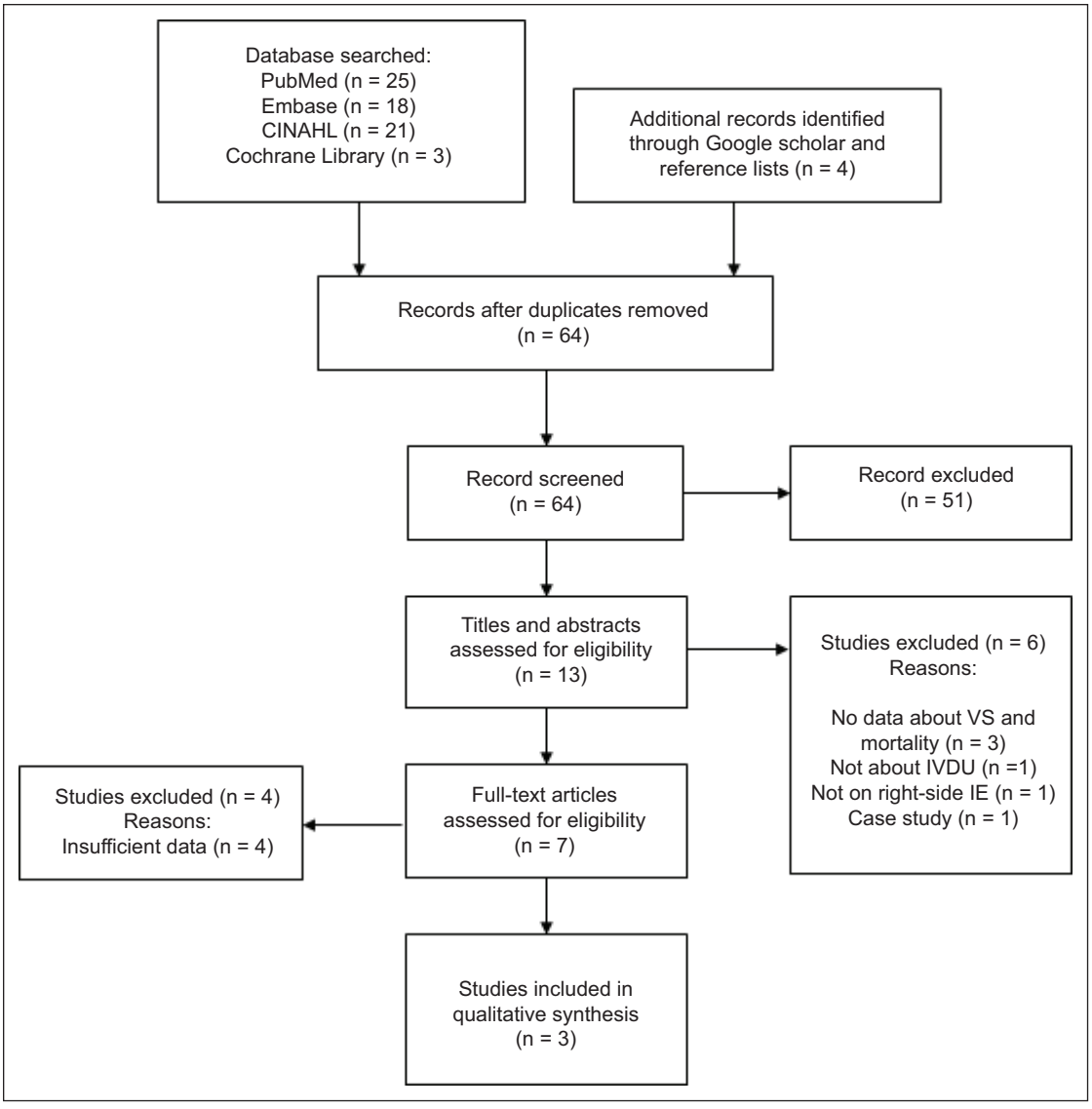

Figure 1. Flow diagram.

There were 269 IVDUs with right-sided IE for which VS measurements were available amongst the three studies. There was consistent use of the Modified Duke criteria across the studies to ensure only participants with a definitive diagnosis of IE were included. Additionally, all studies used transthoracic and/or transesophageal echocardiography to measure VS, using the maximum dimension for their measurements. Vegetations were consistently defined as a localized mass of shaggy echoes adherent to a valve leaflet in all studies, though the studies used different threshold measurements to differentiate small vs. large vegetations (i.e., 10 mm vs. 20 mm). Lastly, there was heterogeneity in the variables/outcomes analyzed in each study, as depicted in Table 1.

Results of studies

Across the three studies, there were 269 episodes of right-sided IE in IVDUs for which VS measurements were available. As depicted in Table 2, there were 21 deaths; unfortunately, the cause of death was only reported in 14 of the 21 cases. Sepsis represented the most significant cause of death, being present in eight of the 14 cases for which a cause of death was reported (see Table 3). Pulmonary embolisms were another major cause of mortality, accounting for five of the remaining cases.

Upon reviewing the correlation between VS and mortality across all included studies, it was found that there was a significant association between vegetations >20 mm and mortality (see Table 2). Though limited by small sample sizes, there were no significant differences in mortality rates between vegetations measuring 0–20 mm, with mortality rates ranging from 0.02–0.05% in these cases. While only 9 of 233 patients with vegetations <20 mm died (~0.4%), 33% of patients with vegetations >20 mm died.

Discussion

Although limited by small sample sizes and retrospective data collection methods, all studies in this review concur that VS directly correlates with

Table 1. Summary of Included Studies.

Study	Median age of participants	Episodes of RSIE with VS measurements (mm)	Mortality % in relation to VS	Variables/Outcomes Analyzed
Martin-Davila et al.; 15 y retrospective study (1985–1999)	27.8 +/– 4.8 yrs (range 18–44)	n = 97 n = 81 (VS < 20) n = 16 (VS > 20)	3.7% (3/81 VS<20) 25% (4/16 VS>20)	Sex, HIV serostatus, CD4 cell count <200/mm3, time of IE diagnosis, previous valyulopathy, polymicrobial IE, fungal etiology, neurological complication, arterial emboli, PE, CHF, VS and in hospital cardiac surgery.
Hetch & Berger, 9 y retrospective study (1978–1986)	31 +/– 7 yrs (range 17–58)	n = 132 n=26 (VS < 10) n = 86 (VS > 10) n = 20 (VS > 20)	0% (0/26 VS < l0) 0.02% (2/86 VS > 10) 40% (8/20 VS >20)	Clinical symptoms and physical findings, pertinent laboratory data, echocardiographic findings, causative organisms, antibiotic regimens, hospital course, duration of fever, complications and outcome (only defined in patients who reached a definitive end point in therapy of cure or death).
Otome et al.; 7 y retrospective study (2005–2011)	28+/- 2 yrs (range 20–55)	n = 40 n = 16 (VS < l0) n= 24 (VS >10)	6% (1/16 VS < 10) 13%(3/24 VS > l0)	Primary outcome: all-cause in-hospital mortality. Secondary outcomes: SS, relapsed and recurrent endocarditis.

Abbreviations: CHF: Congestive heart failure. PE: pulmonary embolism, VS: vegetation size, SS: septic shock

Table 2. Summation of Results Across Studies.

Episodes of RSIE	VS (mm)	Number of deaths	Mortality % in relation to VS
n = 42	<10	n = 1	0.02% (1/42 VS <10)
n = 110	>10	n=5	0.05% (5/110 VS > 10)
n = 81	<20	n = 3	0.04% (3/81 VS <20)
n = 36	>20	n=12	33% (12/36 VS>20)
Total n = 269		Total n = 21	

Abbreviations: RSIE: Right-sided infective endocarditis, VS: vegetation size

Table 3. Cause of Death in Relation to VS.

VS (mm)	Total deaths with reported cause	Cause of Death
<10	n = 0(0/1)	N/A
>10	n = 2(2/5)	PE (n = 1), CVA (n = 1)
<20	n = 0(0/3)	N/A
>20	n = 12 (12/12)	PE(n = 4)
		Sepsis (n = 2)
		Multiorgan failure, sepsis (n = 3)
		ARDS, sepsis (n = 2)
		AV perforation, sepsis (n = 1)

Abbreviations: VS: Vegetation size, PE: pulmonary embolism, CVA: cerebrovascular accident, ARDS: acute respiratory distress syndrome, AV: aortic valve

mortality rate in right-sided IE among IVDUs.[5,13,14] The association of larger vegetations with mortality raises the question of whether vegetations >20 mm should be used as a surgical indication for right-sided IE in IVDUs. The decisions regarding whether and when to proceed with surgical intervention are very challenging, particularly among IVDUs. In addition to the usual morbidity, mortality, and high costs of cardiac surgery, this population may have additional risks due to concerns that poor medical adherence and persistent drug use could compromise recovery and long-term outcomes.[14]

Conclusion

This systematic review of three retrospective studies found VS >20 mm to be a significant predictor of mortality for IVDUs with right-sided IE, identifying sepsis and pulmonary embolisms as the most common causes of death. Further consideration of the use of VS as a surgical indication for right-sided IE among IVDUs may be beneficial to reduce mortality rates in these patients. Formulating level A evidence and applying the findings through multidisciplinary collaboration among cardiologists, cardiovascular surgeons and echocardiographers will be essential to improving the management and prognosis of this complex patient population.[16]

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CJMS Article: Sonography Canada CPD Credit

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Article Title: The Effect of Vegetation Size on Mortality in Intravenous Drug Users with Right-Sided Infective Endocarditis: A Systematic Review

Authors' Names: Alana Currie

1. In IVDUs with IE, vegetations are most often adherent to which cardiac valve?

A. Mitral
B. Aortic
C. Tricuspid
D. Pulmonic

2. Which criteria is used for diagnosing IE?

A. Modified Duke Criteria
B. Duke Criteria
C. MONICA criteria
D. NASCET criteria

3. Which of the following was the most reported cause of death for IVDUs with IE in this systematic review?

A. Pulmonary Embolism
B. Multiorgan failure
C. Aortic valve perforation
D. Sepsis

4. Which bacteria is the most common causative agent for IE in IVDUs?

A. Viridans streptococci
B. Streptococcus gallolyticus
C. Staphylococcus aureus
D. Enterococcus

5. True or False: The prognosis of IE is worse in IVDUs than in non-drug users.

A. True
B. False

2023 Sonography Canada Awards: Recognizing Excellence

Cathy Ridsdale, CRGS, CRVS, Chair of the Awards Committee

Each year, Sonography Canada recognizes and celebrates individuals who have made significant contributions to the profession of sonography or to the association. Our awards recognize the various roles and accomplishments sonographers can have in their careers beginning as students, as they become practitioners, and sometimes as mentors and educators.

So much time, effort, and resources go into ensuring that individuals have the training, tools, and support they need to get the job done right. And when they do get it right … and the job is done exceptionally well … we believe time and effort should be taken to acknowledge it.

Everyone appreciates being recognized for their hard work or innovative ideas. These awards provide our membership with opportunities to acknowledge colleagues who help advance the profession and/or who help others advance within the profession. These awards are our versions of applause, high fives, and fist pumps to outstanding sonography students and professionals. Read on to learn more about this year's recipients and their impressive achievements.

Victor Lee, CRGS, CRCS, RDMS, RDCS

2023 Recipient; Fellowship Award

This award recognizes the outstanding achievement of an Active member that clearly demonstrates the personal and professional qualities that led them to make a significant contribution to our profession and our association. Achievements may fall into one or more of the following categories: education, professional service, patient relations, professional advocacy, student preceptorship, sonographer preceptorship, and research.

Victor Lee currently serves as the Past Chair of the Sonography Canada Board of Directors and has volunteered with the association on an ongoing basis since 2011.

Starting as the Board Liaison between CSDMS & CARDUP (before the amalgamation), Victor continued to volunteer as part of the committee during the amalgamation in 2014. He was then elected as the Eastern Director to the 2016 Board of Directors, subsequently appointed Vice-Chair, and was the Chair of our Board at the beginning of the pandemic.

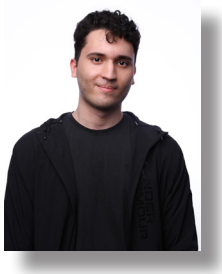
He has served on various committees throughout his tenure and has also contributed to item writing for certification exams.

It must also be mentioned that during Victor's time as Vice-Chair, he took on the leadership role for the organization for 6 months. This was an extremely difficult period for the organization, but Victor led us through the challenges and changes like a true leader.

Victor has been a tireless supporter of Sonography Canada, and we were thrilled to bestow this award on him this year!

Mohamed Nashnoush, CRGS

2023 Recipient; Outstanding Article or Case Study Award



This award recognizes written submissions from sonographers that aim to inform, educate, and inspire their peers with educational topics from the sonography field or relating to the profession of sonography. This year, we are recognizing Mohamed for his Case Study on Innominate Artery Occlusion.

Mohamed currently works at Nova Scotia Health as a generalist and vascular sonographer. Mohamed completed his undergraduate degree in Health Sciences at Dalhousie University, where he completed his vascular and generalist training. He is involved in multiple machine-learning projects that aim to improve the sensitivity and accuracy of ultrasound. As a student, Mohamed served as a student advisor on Sonography Canada's Board of Directors. In his free time, he enjoys supporting nonprofit organizations, playing soccer, and working out.

Amy Bespalko, CRGS, CRCS

2023 Recipient; Early Professional Achievement Award

This award celebrates outstanding sonographers who distinguish themselves early on in their careers by demonstrating leadership, a desire to further their knowledge and skills, and actively participating in the profession. By recognizing potential, we hope to inspire students and sonographers to become more involved in improving our profession.

Amy attended the Northern Alberta Institute of Technology for Diagnostic Medical Sonography and graduated in December 2019. She received her CRGS and CRCS credentials in early 2020.

Amy worked in Grande Prairie for Alberta Health Services for 2 years as a sonographer and echocardiographer. While there, training was completed in Pediatric Echocardiography and Nuchal Translucency.

Amy decided to return to her hometown of St. Paul, Alberta to open its first and only outpatient medical imaging clinic, Lakeland Diagnostic Imaging. It has always been Amy's goal to return to St. Paul and serve the community. She has been able to bring services to St. Paul that were previously unavailable, such as echocardiography and pediatric scanning among others.

Amy looks forward to being able to accept sonography students for their clinical practicum as soon as the clinic is a suitable environment for optimal learning.

Jia Qian Lu CRGS, RDMS

2023 Recipient; Outstanding Journal Submission Award

This award acknowledges members who have exemplified excellence in providing educational and informative articles to the *Canadian Journal of Medical Sonography* (CJMS). These members have taken the lead in understanding current trends and find time to share their knowledge with other sonographers to share, excite and educate. Her article, The Role of Sonography in Managing Hidradenitis Suppurativa, was in our second issue of the CJMS in 2022.

Jia Qian Lu completed a bachelor's degree in Medical Radiation Sciences from McMaster University and Ontario College Advanced Diploma in Ultrasonography from Mohawk College. She also holds a Certificate in Clinical Education and a Leadership in Health Care Certificate from the Michener Institute of Education at UHN.

Jia Qian has been granted status appointment of Clinical Educator from Michener since 2016 and has been doing clinical teaching since 2013. She has spent the last 9 years working at the University Health Network and Sunnybrook Health Sciences Centre in the General Ultrasound department and Breast Cancer Centre as a Senior Sonographer.

Jia Qian is part of the Diagnostic Medical Sonography Faculty at Anderson College serving as the Clinical Practicum Liaison. She was the sonographer recipient of the Peter McLardie Memorial Education Bursary Award in 2018. Jia Qian is a firm believer in lifelong learning and is currently pursuing a master's degree at Dalhousie University.

Jaylene Jay

2023 Recipient; Peter McLardie Education Bursary (Student)

This bursary was created to recognize Peter McLardie's extensive contributions to the ultrasound profession in Canada. Award applicants must submit an essay outlining how Peter McLardie's values and dedication have influenced the ultrasound profession. They must also express how they have demonstrated Peter's values in the following three categories: community, mentorship, and integrity.

2023 Recipient; Student Achievement Award

This award encourages and recognizes outstanding written case studies, essays and/or literature reviews produced by students. They are challenged to write an article on a topic of interest they wish to share with fellow sonographers or share interesting cases, discuss current issues, and increase sonographers' awareness of new ideas and information. Sonography Canada encourages sonography students to experience the rewards of educating their peers and inspiring others to do the same.

Jaylene is a third-year Diagnostic Medical Ultrasound student at Dalhousie University and will be graduating in the fall of 2023. She has previously obtained her Bachelor of Science in Biology from the University of Prince Edward Island. Jaylene will be starting her career with Nova Scotia Health Authority at the QEII Health Sciences Centre. Throughout her time at Dalhousie, she worked as an ultrasound lab assistant, where she provided guidance and technical instruction to the classes below her. She hopes to continue

mentoring incoming sonographers and broaden her involvement within the sonography community in the future. In her free time, she enjoys reading, attending Pilates, and spending time with friends.

John Christopher Harrington, CRGS, CRCS-AE, CRVS

2023 Recipient; Lifetime Achievement Award

This award recognizes a Sonography Canada member for their exceptional leadership, service, and passion for excellence in sonography. It acknowledges sonographers who have continued to render exceptional services to the sonography profession and whose achievements in their careers and in the community have earned them distinction. The Lifetime Achievement Award recognizes an individual's outstanding contributions made throughout their career which have served to advance excellence in the profession and continue to inspire others in their community.

Dr. Lyons (who created the first general ultrasound department in North America) hired Chris as a sonographer and then as the instructor and program director 35 years ago, and according to Dr. Lyons, "it was the smartest thing he did in his career."

Chris studied Nuclear Medicine at Red River Community College. Denis Gratton, the first program director of the HSC ultrasound training program described him as a star student who had the "right stuff" to be a master educator and leader among his peers in the education of sonographers.

Chris has been a true educator, innovator, and leader in the field of diagnostic medical sonography in Canada. However, his heart has made the greatest impact. If you speak to a Manitoba sonographer who graduated in the last 30 years and ask them who helped shape them into the professionals they are today – they will say Chris Harrington.

His involvement with Sonography Canada and the advancement of the profession continues to this day, as he is currently helping develop the association's upcoming Carotid Certificate course. In addition, he recently helped prepare the documentation submitted to government for self-regulation, as part of the application process.

We are so grateful that Chris chose sonography as a profession!

Prix 2023 d'Échographie Canada: Reconnaître l'excellence

Cathy Ridsdale, CRGS, CRVS , Présidente du Comité des prix et bourses

Chaque année, Échographie Canada reconnaît et célèbre les individus dont les contributions ont eu un impact significatif sur la profession ou l'association. Nos prix reconnaissent les différents rôles et réalisations des échographistes au cours de leur carrière, d'abord comme étudiants, ensuite comme praticiens, et parfois comme mentors ou éducateurs.

On consacre tellement de temps, d'efforts et de ressources pour s'assurer que les individus ont la formation, les outils et le soutien dont ils ont besoin pour bien faire leur travail. Et lorsqu'ils le font bien... et que le travail est exceptionnellement bien fait... nous sommes d'avis qu'il faut consacrer du temps et des efforts pour le reconnaître.

Tout le monde apprécie d'être reconnu pour son travail acharné ou ses idées novatrices. Ces prix offrent à nos membres l'occasion de reconnaître les collègues qui contribuent à faire progresser la profession et/ou qui aident les autres à progresser au sein de la profession. Ces prix sont nos versions d'applaudissements, de «high fives» et de «fist pumps» aux étudiants et aux professionnels en échographie exceptionnels. Lisez ce qui suit pour en savoir plus sur les lauréats de cette année et leurs réalisations impressionnantes.

Victor Lee, CRGS, CRCS, RDMS, RDCS

Récipiendaire 2023; Prix Fellowship

Ce prix est décerné à un membre actif en reconnaissance de ses réalisations exceptionnelles qui démontrent clairement les qualités personnelles et professionnelles qui l'ont amené à apporter une contribution significative à notre profession et à notre association. Les réalisations peuvent s'inscrire dans une ou plusieurs des catégories suivantes : l'éducation, le service professionnel, les relations avec les patients, la défense des intérêts professionnels, le préceptorat des étudiants, le préceptorat des échographistes, et la recherche.

Victor Lee est présentement le président sortant du conseil d'administration d'Échographie Canada et est bénévole auprès de l'association, sur une base continue, depuis 2011.

Il a d'abord agi comme agent de liaison entre le SCEM et l'ACPAED (avant la fusion) et a continué de se porter volontaire au sein du comité lors de la fusion en 2014. Il a ensuite été élu au conseil d'administration de 2016 en tant que directeur de la région de l'Est, suivi d'une nomination au poste de vice-président, pour enfin assumer le poste de président au début de la pandémie.

Il a siégé à divers comités tout au long de son mandat et a également contribué à la rédaction de questions pour les examens de certification.

Il convient également de mentionner qu'au cours de son mandat à titre de vice-président, Victor a assumé le rôle de dirigeant de l'organisation pendant une période de six mois. Cette période a été extrêmement difficile pour l'organisation, mais Victor nous a permis de relever les défis et de faire face aux changements comme un véritable leader.

Victor est un partisan inlassable d'Échographie Canada, et nous avons été ravis de lui décerner ce prix cette année!

Mohamed Nashnoush, CRGS

***Récipiendaire 2023;* Prix pour un article ou étude cas exceptionnel(le)**

Ce prix souligne les observations écrites soumises par des échographistes qui cherchent à informer, éduquer et inspirer leurs pairs sur des thèmes éducatifs pertinents au domaine de l'échographie ou à la profession d'échographiste. Cette année, nous rendons hommage à Mohamed pour son étude de cas sur l'occlusion artérielle innominée.

Mohamed occupe actuellement un poste d'échographiste généraliste et vasculaire auprès de Nova Scotia Health. Mohamed a obtenu son diplôme de premier cycle en sciences de la santé à l'université Dalhousie où il a complété sa formation d'échographiste vasculaire et généraliste. Il participe à de nombreux projets d'apprentissage automatique visant à améliorer la sensibilité et la précision de l'échographie. Lorsqu'il était étudiant, Mohamed a siégé en tant que conseiller étudiant au conseil d'administration d'Échographie Canada. Dans ses temps libres, il aime soutenir des organismes à but non lucratif, jouer au soccer, et faire de l'exercice.

Amy Bespalko, CRGS, CRCS

***Récipiendaire 2023;* Prix de réussite professionnelle précoce**

Ce prix célèbre les échographistes exceptionnels qui se distinguent dès le début de leur carrière en faisant preuve de leadership, d'un désir d'approfondir leurs connaissances et leurs compétences, et en participant activement à la profession. En reconnaissant le potentiel, nous espérons inspirer les étudiants et les échographistes à s'impliquer davantage dans l'amélioration de notre profession.

Amy a poursuivi ses études à l'Institut de technologie du Nord de l'Alberta en échographie médicale diagnostique et a obtenu son diplôme en décembre 2019. Elle a obtenu ses titres de compétence CRGS et CRCS au début de 2020.

Amy a travaillé à Grande Prairie pour les services de santé de l'Alberta pendant deux ans à titre d'échographiste et d'échocardiographe. Pendant son séjour, elle a complété sa formation en échocardiographie pédiatrique et en translucidité nucale.

Amy a décidé de retourner dans sa ville natale de St. Paul, en Alberta, pour y ouvrir la première et unique clinique de consultation externe d'imagerie médicale, Lakeland Diagnostic Imaging. L'objectif d'Amy a toujours été de revenir à St. Paul et de servir la communauté. Elle a été en mesure d'apporter à St. Paul des services qui n'étaient pas disponibles auparavant, notamment l'échocardiographie et les examens échographiques pédiatriques.

Amy envisage avec enthousiasme d'accueillir des étudiants en échographie pour leur stage clinique dès que la clinique constituera un environnement propice à un apprentissage optimal.

Jia Qian Lu CRGS, RDMS

***Récipiendaire 2023;* Prix pour une soumission exceptionnelle à la Revue**

Ce prix reconnait les individus qui personnifient l'excellence en soumettant des articles éducatifs et instructifs à la *Revue canadienne de l'échographie médicale* (RCEM). Ces membres sont chefs de file en matière de compréhension des tendances actuelles et prennent le temps de partager leurs connaissances avec les autres échographistes afin de partager, motiver et éduquer. Son article, *The Role of Sonography in Managing Hidradenitis Suppurativa*, a été publié dans notre deuxième numéro du CJMS en 2022.

Jia Qian Lu est titulaire d'un baccalauréat en sciences de la radiation médicale de l'Université McMaster et d'un diplôme d'études supérieures en échographie du Collège Mohawk de l'Ontario. Elle détient également un certificat en éducation clinique et un certificat en leadership en soins de santé de l'Institut Michener d'éducation du Réseau universitaire de santé (UHN).

Jia Qian a obtenu le statut d'éducatrice clinique de Michener en 2016 et enseigne en clinique depuis 2013. Elle a consacré les neuf dernières années à travailler au Réseau universitaire de santé et au Sunnybrook Health Sciences Centre dans le département d'échographie générale et le Centre du cancer du sein en tant qu'échographiste principale.

Jia Qian est membre de la faculté d'échographie médicale diagnostique de l'Anderson College, où elle assure la liaison avec les stages cliniques. Elle a été la lauréate de la bourse d'étude commémorative Peter McLardie à l'intention d'un(e) échographiste en 2018. Jia Qian croit fermement à l'apprentissage continu et poursuit présentement une maîtrise à l'Université Dalhousie.

Jaylene Jay

***Récipiendaire 2023;* Bourse d'étude commémorative Peter McLardie – Étudiant(e)**

Cette bourse a été créée en reconnaissance de l'importante contribution de Peter McLardie à la profession de l'échographie au Canada. Les candidats doivent soumettre un essai décrivant comment les valeurs et le dévouement de Peter McLardie ont influencé la profession d'échographiste. Ils doivent également expliquer comment ils ont manifesté les valeurs de Peter dans les trois catégories suivantes : la communauté, le mentorat et l'intégrité.

***Récipiendaire 2023;* Prix de la réussite d'un(e) étudiant(e)**

Ce prix encourage et reconnaît les études de cas, les essais et/ou les analyses documentaires exceptionnels rédigés par des étudiant(e)s. Ils sont mis au défi de rédiger un article sur un sujet d'intérêt qu'ils souhaitent partager avec leurs collègues échographistes ou de partager des cas intéressants, de discuter de questions d'actualité, et de sensibiliser les échographistes à de nouvelles idées et à de nouvelles informations. Échographie Canada encourage les étudiant(e)s en échographie à découvrir les bienfaits d'éduquer leurs pairs et d'inspirer les autres à faire de même.

Jaylene est étudiante de troisième cycle en échographie médicale diagnostique à l'université Dalhousie et obtiendra son diplôme à l'automne 2023. Elle a déjà obtenu un baccalauréat en biologie auprès de l'Université de l'Île-du-Prince-Édouard. Jaylene commencera sa carrière à Santé Nouvelle-Écosse, au Centre des sciences de la santé de l'hôpital Queen Elizabeth II (QEII). Pendant ses études à Dalhousie, elle a travaillé en tant qu'assistante de laboratoire d'échographie, où elle a fourni des conseils et des instructions techniques aux classes suivants la sienne. Elle espère continuer à encadrer les nouveaux échographistes et élargir son engagement au sein de la communauté échographique à l›avenir. Pendant son temps libre, elle aime lire, suivre des cours de Pilates et passer du temps avec ses amis.

John Christopher Harrington, CRGS, CRCS-AE, CRVS

***Récipiendaire 2023;* Prix pour l'ensemble des réalisations**

Ce prix récompense un membre d'Échographie Canada pour leur leadership exceptionnel, leurs services, et leur passion pour l'excellence en échographie. Il reconnaît les échographistes qui ont continué à rendre des services exceptionnels à la profession d'échographiste et dont les réalisations au cours de leur carrière et dans la communauté ont mérité des honneurs. Le Prix pour l'ensemble des réalisations reconnaît les contributions exceptionnelles d'une personne, tout au long de leur carrière, qui ont permis de faire progresser l'excellence dans la profession et continuent d'inspirer d'autres personnes dans leur communauté.

Le Dr Lyons (qui a créé le premier département d'échographie générale en Amérique du Nord) a engagé Chris comme échographiste, et ensuite comme instructeur et directeur de programme il y a 35 ans, et selon le Dr Lyons, « c'est la décision la plus intelligente qu'il ait prise au cours de sa carrière ».

Chris a étudié la médecine nucléaire au Red River Community College. Selon Denis Gratton, premier directeur du programme de formation en échographie de l'HSC, Chris était perçu comme un étudiant exceptionnel qui avait « tout ce qu'il fallait » pour devenir un maître éducateur et un chef de file parmi ses pairs dans le domaine de la formation des échographistes.

Chris a été un véritable éducateur, innovateur, et leader dans le domaine de l'échographie médicale diagnostique au Canada, mais c'est son cœur qui a eu le plus grand impact. Si vous parlez à un échographiste manitobain qui a obtenu son diplôme au cours des 30 dernières années et que vous lui demandez qui a contribué à le façonner pour en faire le professionnel qu'il est aujourd'hui, il vous répondra Chris Harrington.

Son implication auprès d'Échographie Canada et dans l'avancement de la profession se poursuivent encore aujourd'hui puisqu'il participe actuellement à l'élaboration du prochain cours de certification de l'association sur la carotide. De plus, il a récemment participé à la préparation de la documentation soumise au gouvernement pour l'autoréglementation, dans le cadre du processus d'application.

Nous sommes tellement reconnaissants que Chris ait choisi l'échographie comme profession!