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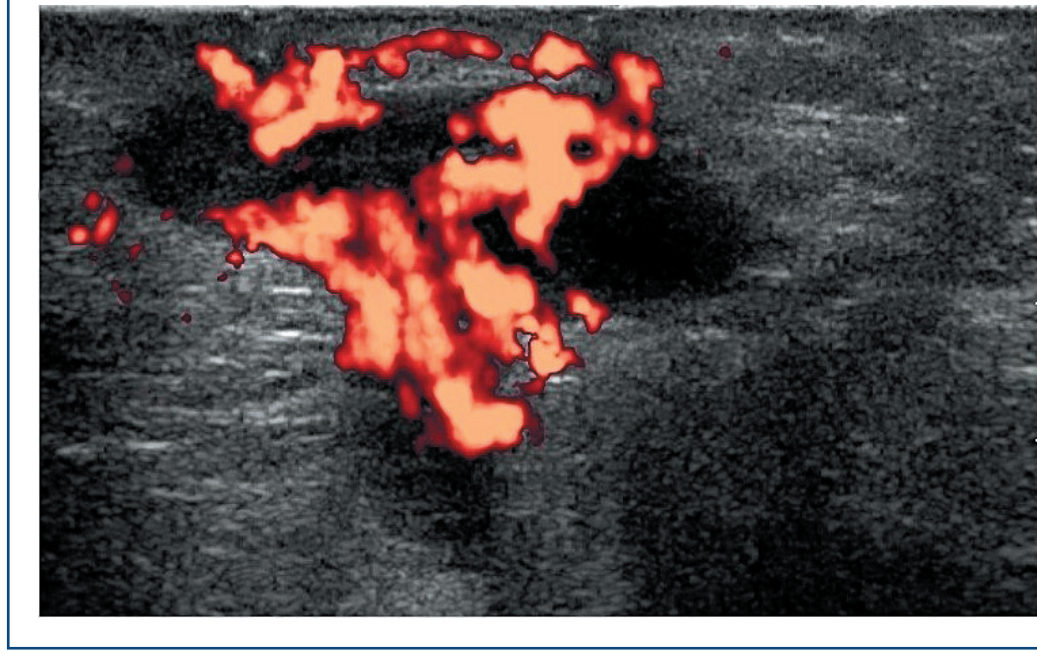

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About the cover

The cover image is Figure 4. Abscess in the right axilla in the oblique view from "The Role of Sonography in Managing Hidradenitis Suppurativa: A Case Report" by Jia Qian Lu, BMRSc, DMS CRGS, RDMS

Message from the Editor-in-Chief

Happy Summer to all Sonography Canada members. This issue of CJMS has some interesting and relevant information for all Sonographers.

Sonography Canada has published the results of the 2022 membership survey with a response rate of 14% of our membership, representing 947 of our 6661 members. This survey was conducted to inform Sonography Canada's 2023-2026 strategic planning process and activities for the next three years. The survey addressed employment expectations, working conditions, the impact of the COVID-19 pandemic, credentials, and overall satisfaction with key Sonography Canada membership features. Make sure you read this information; I found it very interesting and informative.

A team of students from The Michener Institute of Education at UHN conducted a literature review on the Impact of COVID-19 on the Mental Health of Diagnostic Imaging Professionals. The evidence confirms what you may already suspect; that the mental status of medical imaging professionals has been negatively impacted by the repercussions of COVID-19. This finding is also supported by the Sonography Canada 2022 member survey, which reports that 45% of Canadian Sonographers are "identifying general stress and burnout as the top three most important factors to affect sonographers in the future." Sonography Canada also suggests that we "must look for meaningful ways to help improve the physical and mental health of the sonography workforce in Canada."

Jia Qian Lu is a generalist Sonographer from Sunnybrook Hospital who has written an interesting case report on a rare disease called Hidradenitis Suppurativa. This case follows a patient's painful journey from the start of their symptoms to the final diagnosis and emphasizes the importance of imaging in their care and diagnosis.

I hope you enjoy and learn from the articles in this issue. Please do reach out for mentorship if you are considering submitting a case study or research report to CJMS but need some advice. We have a recorded webinar that goes through the steps of writing a case study, and I, our editors and reviewers would be happy to mentor you if you have an interesting case.

Don't forget to register for Sonocon 2022!

Sheena Bhimji-Hewitt

Broadening Horizons & Pushing Boundaries

*The opinion in this editorial is that of the Editor-in-Chief and not that of Sonography Canada or the Sonography Board of Directors.

Message de la rédactrice en chef

Bon été à tous les membres de Sonographie Canada. Ce numéro de CJMS contient des informations intéressantes et pertinentes pour tous les échographistes.

Sonographie Canada a publié les résultats du sondage 2022 auprès des membres avec un taux de réponse de 14% de nos membres, ce qui représente 947 de nos 6661 membres. Ce sondage a été mené pour informer le processus de planification stratégique 2023-2026 de Sonographie Canada et les activités des trois prochaines années. Le sondage portait sur les attentes en matière d'emploi, les conditions de travail, l'impact de la pandémie de COVID-19, les titres de compétences et la satisfaction générale à l'égard des principales caractéristiques des membres de Sonographie Canada. Assurez-vous de lire cette information ; je l'ai trouvée très intéressante et instructive.

Une équipe d'étudiants du Michener Institute of Education de l'UHN a effectué une analyse documentaire sur l'impact de COVID-19 sur la santé mentale des professionnels de l'imagerie diagnostique. Les preuves confirment ce que vous soupçonnez peut-être déjà, à savoir que l'état mental des professionnels de l'imagerie médicale a été négativement affecté par les répercussions de COVID-19. Cette constatation est également appuyée par le sondage mené auprès des membres de Sonographie Canada 2022, qui rapporte que 45 % des échographistes canadiens "identifient le stress général et l'épuisement professionnel comme les trois facteurs les plus importants qui affecteront les échographistes à l'avenir." Sonographie Canada suggère également que nous "devons chercher des moyens significatifs pour aider à améliorer la santé physique et mentale de la main-d'œuvre en échographie au Canada."

Jia Qian Lu est une échographiste généraliste de l'hôpital Sunnybrook qui a écrit un rapport de cas intéressant sur une maladie rare appelée Hidradenitis Suppurativa. Ce cas suit le parcours douloureux d'un patient, du début de ses symptômes au diagnostic final, et souligne l'importance de l'imagerie dans ses soins et son diagnostic.

J'espère que vous apprécierez les articles de ce numéro et que vous en tirerez des enseignements. Si vous envisagez de soumettre une étude de cas ou un rapport de recherche à la CJMS et que vous avez besoin de conseils, n'hésitez pas à vous adresser à un mentor. Nous avons enregistré un webinaire qui explique les étapes de la rédaction d'une étude de cas, et moi-même, nos rédacteurs et nos réviseurs serions heureux de vous encadrer si vous avez un cas intéressant.

N'oubliez pas de vous inscrire à la Sonocon 2022 !

Sheena Bhimji-Hewitt

Élargir les horizons et repousser les frontières

*L'opinion exprimée dans cet éditorial est celle du rédacteur en chef et non celle de Sonographie Canada ou du conseil d'administration de Sonographie.

Case Report

Jia Qian Lu, BMRSc, DMS CRGS, RDMS

The Role of Sonography in Managing Hidradenitis Suppurativa: A Case Report

About the Author

Jia Qian Lu is a Generalist Sonographer and works at the Breast Cancer Centre at Sunnybrook Health Sciences Centre in Toronto, Ontario. She has a bachelor's degree in Medical Radiation Sciences from McMaster University and an Advanced Diploma in Ultrasonography from Mohawk College. She also has certificates in Clinical Education and Leadership in Health Care from the Michener Institute of Education at UHN.

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ABSTRACT

Hidradenitis Suppurativa (HS) is a chronic inflammatory disorder that causes small lumps under the skin that can be painful and debilitating. Its prevalence is approximately 1% globally. In addition, this disorder may be associated with other systemic conditions, obesity, and smoking. This case report describes the findings on ultrasound imaging of a patient with HS and identifies the most suitable medical management techniques for this patient.

Keywords: Hidradenitis Suppurativa, acne inversa, abscess, Hurley, rheumatoid arthritis, ultrasound, antibiotics

Introduction

Hidradenitis Suppurativa (HS), also known as acne inversa, is a rare, chronic, debilitating inflammatory disorder associated with numerous systemic comorbidities and usually begins in early adulthood.[1] HS has been predominantly studied in European countries, with a disease prevalence at approximately 1% based on a French community study[2] and an estimated prevalence of 0.03 to 1% globally.[3] Since this disorder affects intertriginous skin, patients suffer from painful, inflamed nodules, abscesses, and fistulas, which occur in sensitive areas such as; inframammary folds, axillae, inguinal regions, vulva, abdominal folds/pannus, gluteal and perianal areas.[1]

The etiology of HS is comprised of multiple factors, such as genetics, lifestyle, and microbiota.[1] These factors contribute to immune activation around terminal hair follicles and thickening of the openings of the hair follicles, leading to intertriginous skin occlusions, resulting in pus formation, irreversible tissue destruction, and scar development.[1] Due to the severe pain and foul odour from these

purulent secretions, HS patients, suffer emotionally and physically.[1] Around 30% of HS patients report a familial predisposition for HS.[4] Two major lifestyle factors seem to contribute to HS, they are obesity and tobacco smoking.[4] Approximately 60% of HS patients are obese.[3] Obese patients with enlarged skin folds may have increased mechanical stressors, maceration, and anaerobic conditions within those folds.[4] Obese patients may also present with subclinical inflammation in adipose tissue that reaches back into the skin via blood flow.[4] Up to 90% of HS patients report either having smoked tobacco previously or doing so at present.[4] Nicotine from tobacco has been known to cause epidermal hyperplasia and dysbiosis, which may increase the risk of plugging the hair follicles and microbial imbalance.[4] HS is associated with multiple systemic manifestations, such as Crohn's disease and Rheumatoid Arthritis (RA).[2] Due to obesity being one of the lifestyle factors that induce HS; HS may also be associated with hypertension, dyslipidemia, and hyperglycemia.[1]

There are a few staging tools for scoring HS. The most widely used is the Hurley stage.[1] Stage I (mild) is quantified as single or multiple abscess formation without cicatrization.[1] Stage II (moderate) is defined by single or multiple recurrent abscesses and widely separated lesions, with tunnel formation and/or scarring.[1] Stage III (severe) is described as near-diffuse or diffuse involvement of multiple interlinked tunnels and abscesses across the entire area and/or multiple body parts.[1] The following case report demonstrates a patient's journey during a HS flare-up and the role of sonography in identifying the most suitable management techniques for the patient.

Case Description

A 34-year-old premenopausal woman (Body Mass Index >30) presented to the Emergency Department (ED) in the evening with a flare-up from Hidradenitis Suppurativa (HS). This patient presented with multiple draining lesions in the right breast, inframammary folds, and axilla. There were marked skin changes with erythema and cellulitis. Symptoms of the patient included severe, acute pain for the last 2 weeks and nausea but no vomiting. A fever of 39.0°C was documented in the ED. The patient stated that she had been suffering from HS for one year and was seeing her general practitioner and outpatient dermatologist regarding HS. The patient was given a prescription for Percocet from her dermatologist for her long-term pain, which she was taking chronically. The patient was taught by her current dermatology clinic to self-dress draining lesions on her body. Even though the patient presented in the ED with main concerns on her right breast and axilla, she had been suffering from chronically draining lesions from multiple places on her body, including her abdomen, groin, back, and legs. The patient had been prescribed Humira, and she had been taking this medication for the last 4 months with no improvement in symptoms. The patient also had other comorbidities, including Stage IV Chronic Kidney Disease, specifically IgA nephropathy, anemia, cardiomyopathy, gout, and rheumatoid arthritis (RA). The patient was given hydromorphone while in the ED for her severe pain. She was then discharged from the ED with a prescription for prophylactic tetracycline and an outpatient appointment at the Breast Imaging Department, returning the next day to further evaluate the right breast and axilla through imaging.

A request to rule out abscess in the right breast and axilla was entered into the Radiological Information System at the Breast Imaging Centre. As per the Breast Imaging Centre's protocol and the most suitable modality of choice in this situation, the patient was to be evaluated with ultrasound. Fluid collections or even more complicated collections are best located with ultrasound imaging. Ultrasound can be tolerated by the patient with localised pain since the patient's positioning can be more flexible. After obtaining informed consent and clinical history, the Sonographer positioned and draped the patient. The patient could not tolerate the position of the left posterior oblique with a supporting sponge under the right shoulder due to her pain. The patient could lie supine with the right arm raised

above the head, with the arm resting on a rolled towel for comfort. Even though the patient had taken a Percocet that day, she was still in excruciating pain from her right breast and axilla. The right breast and axilla were exposed for scanning. Due to the presence of HS for the past year, there were multiple skin openings with pus oozing and partially opened wounds on the skin. The Sonographer prepared the ultrasound transducer with a sterile probe cover (TIDIShield) and used sterile gel (Aquasonic 100). These measures were used to prevent superimposed infection or further infection. A Philips IU22 ultrasound system with the linear array L17-5 transducer and a breast preset were utilized. The Sonographer carefully scanned the entire right breast and axilla to rule out any presence of collections or any findings to suggest any abscesses. The Sonographer could not apply much transducer pressure due to the patient's discomfort, and gentle gliding motion with lots of acoustic gel was used for the patient's tolerance. The Sonographer noted during the exam that there were scars and indentations on the patient's skin most likely due to the previous flare-ups of HS. To expedite the ultrasound examination and shorten the patient's discomfort, the Sonographer called the attending breast Radiologist to be present in the room to view the exam while the Sonographer scanned instead of having the radiologist rescan. The Sonographer's technical preliminary impression indicated two hypervascular, organized collections seen within the right breast; one located at 12 O'Clock with skin thickening (Figure 1), subcutaneous edema (Figure 2), and adjacent echogenic fat (Figure 3) secondary to an inflammatory response. No axillary lymphadenopathy in level I (lymph nodes along the edge and next to the pectoralis minor muscle) but level II (lymph nodes deep to and beneath the pectoralis minor) could not be adequately assessed due to the lack of probe pressure that could be applied.

Level III (lymph nodes above the pectoralis muscle) could not be adequately assessed due to the patient's level of discomfort. The radiologist's final report confirmed multiple complex fluid collections (Figure 4) with associated hypervascularity (Figure 5)

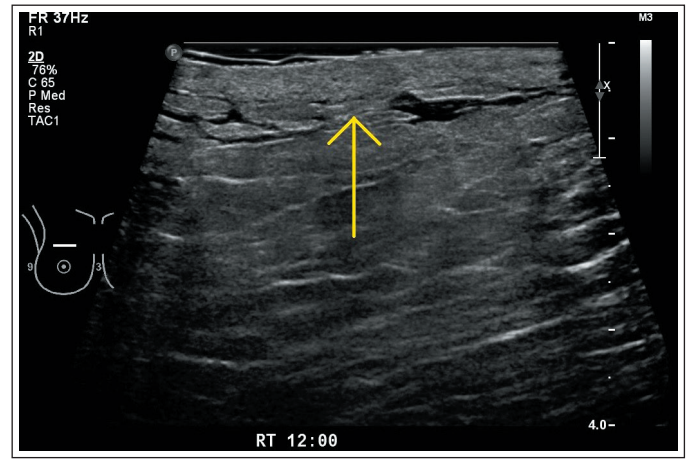

Figure 1. Arrow indicates skin thickening at 12 O'Clock.

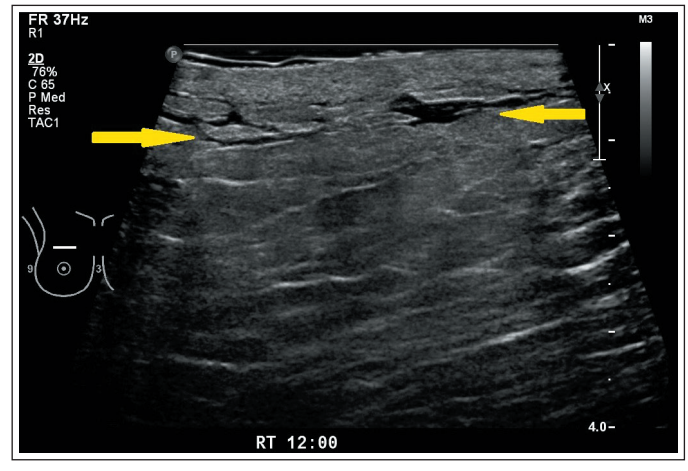

Figure 2. Arrows indicate subcutaneous edema noted in the right breast at 12 O'Clock.

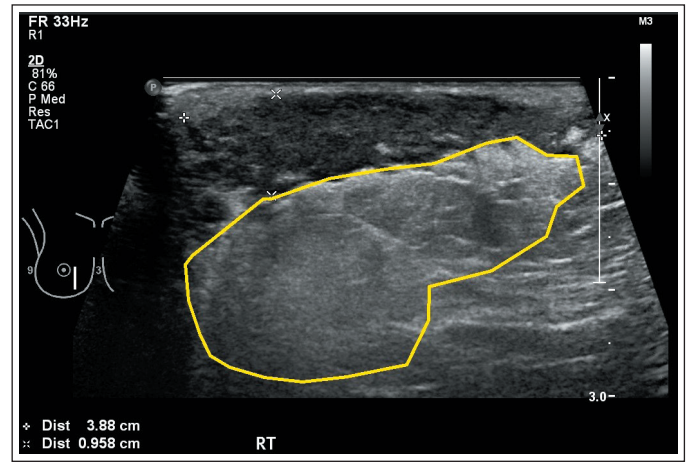

Figure 3. The yellow outline identifies echogenic fat secondary to the adjacent collection in the right breast.

measuring 3.4 x 2.5 x 1.7 cm in the right lower axilla/axillary tail with a small tract (Figure 6) noted extending to the skin. Two other complex fluid collections with hypervascularity were also noted, the first in the lower inner quadrant of the right breast measuring 4 x 5 x 1 cm (Figure 7) and the second in the lower outer quadrant measuring 5.3 x 8.2 x 0.8 cm. In addition, edematous changes were noted in the breast parenchyma with skin thickening. The radiologist recommended abscess drainage, and with informed consent from the patient, drainage was conducted. The purpose of this drainage was diagnostic and therapeutic. Standard preparation and draping were done, followed by a transdermal and subcutaneous local anesthetic (1% lidocaine) administered by the radiologist. Due to the complexity and viscosity of the fluid collections, the radiologist opted to use a 14G angiocatheter as the access needle for the procedure (see Figure 8). The first attempted collection was in the right axilla due to the most appropriate amiability for drainage.

Only a few drops of thick, sanguineous fluid were obtained. A portion of the fluid was sent in a sterile container to Microbiology for testing Culture and Sensitivity (C&S), Fungus, and AFB (Acid-fast bacillus). The rest of the fluid was sent in Saccomanno solution to the Department Cytology. Due to the

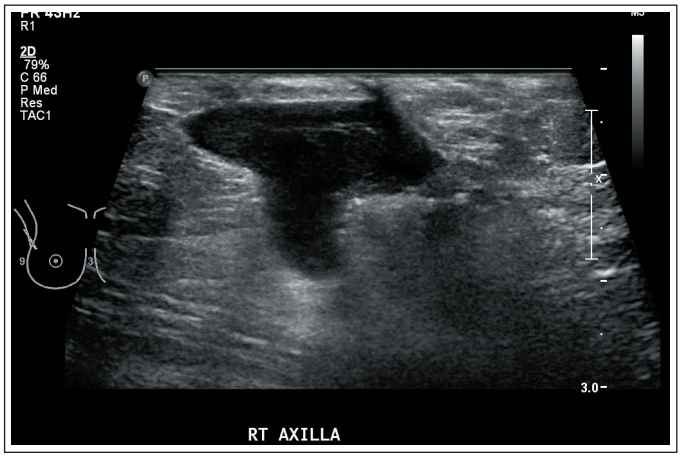

Figure 4. Abscess in the right axilla in the oblique view.

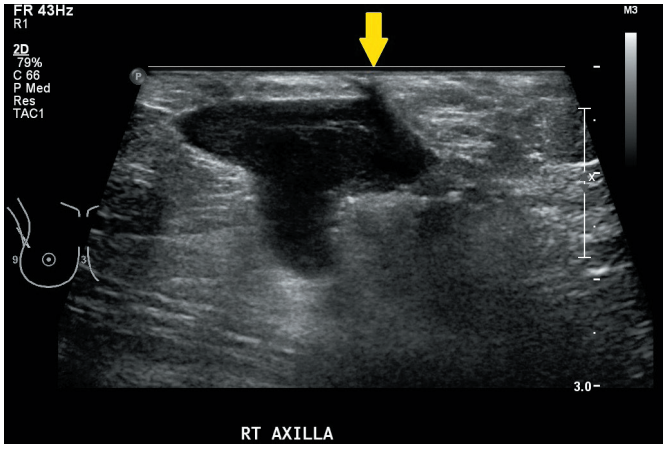

Figure 6. Arrow indicates the skin tract of the abscess in the right axilla.

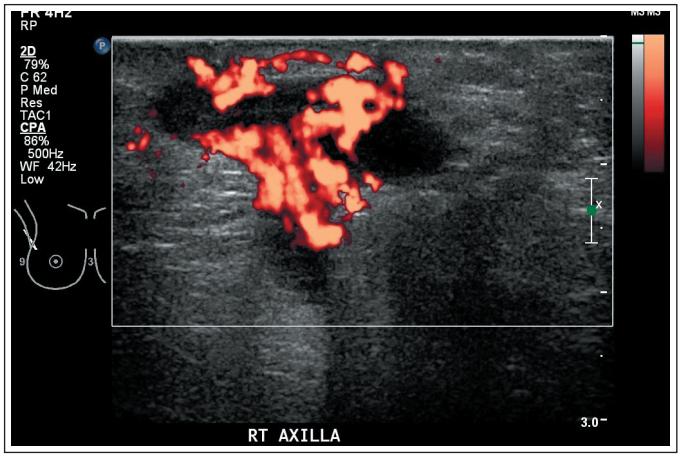

Figure 5. Right axillary abscess with associated hypervascularity.

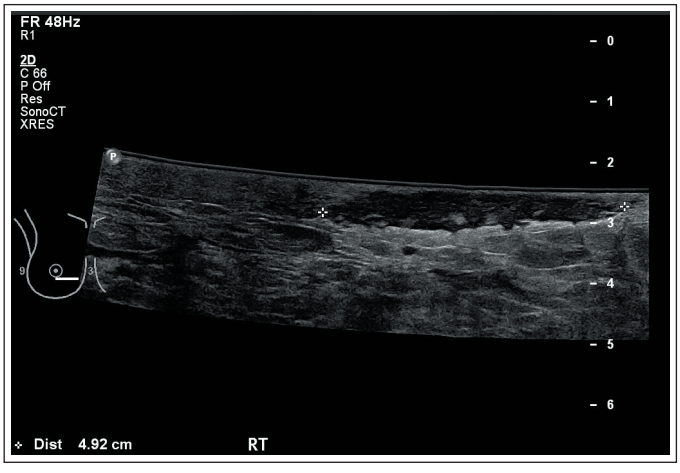

Figure 7. Complex collection in transverse view in the right breast lower inner quadrant.

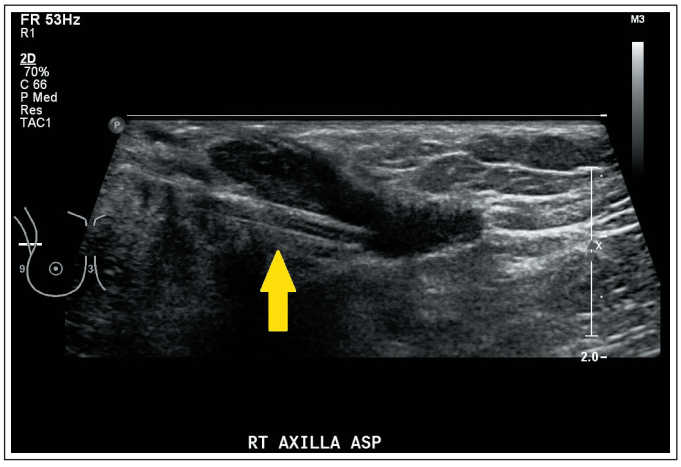

Figure 8. Arrow indicates the 14G angiocatheter that is used as an access needle for the right axillary abscess drainage.

patient's pain, another collection could not be attempted for drainage. The microbiology report noted multiple organisms present, negative for AFB/No TB and no fungus isolated. The microscopy results were as follows: moderate growth of Parvimonas micra and scant growth of streptococcus constellatus. The cytology results indicated acute inflammatory cells and multinucleated histocytes were present with no malignant cells seen.

After the ultrasound and drainage procedure, the patient was given wound care instructions and returned to the ED for further assessments if necessary. The patient was referred by the ED to see the Breast Specialist at the hospital. From there, the patient was instructed to switch her antibiotics from tetracycline to clindamycin as clindamycin was the most active and effective antibiotics to treat parvimonas micra and streptococcus constellatus as determined from C&S. The Breast Specialist then referred the patient to the specialty HS clinic with the department of Dermatology. The dermatologist specializing in HS counselled the patient about the etiology and risk factors (smoking and obesity), prognosis, and treatment options. The patient was given moxifloxacin 400 mg QD for 1 month. The patient was referred to a rheumatologist to consider another biological therapy used to target HS and RA. The patient was then given a punch biopsy from an eroded plaque on the lower abdomen to rule out pyoderma gangrenosum (PG), a known differential diagnosis.[1] The pathology result indicated granulation tissue with neutrophilic spongiosis in the follow-up appointment two weeks from the initial HS Clinic visit. During this visit, the patient revealed that she was a non-smoker currently (no history of past tobacco use was documented). The patient had a maternal uncle who also suffered from HS, a risk factor. The patient was still waiting to hear back for an appointment with the rheumatologist. The dermatologist performed a focused skin exam and concluded that the patient's HS belonged in the Hurley Stage III category due to multiple nodules and draining sinuses in bilateral breasts and axillae, on the lower abdomen, and bilateral groins. The dermatologist suggested using prednisone, but the patient has declined. The plan from this second appointment with the HS clinic resulted in the patient continuing to take Humira 80 sc q (injected subcutaneously daily) and moxifloxacin 400 mg for one month, and a follow-up appointment was planned for 1 month. The patient's ED and Breast Imaging centre visits helped expedite the patient's care, and the patient could see HS specialists who were experts in this rare condition.

Discussion

Sonographic examination was conducted on a patient with known HS who was in excruciating pain in the regions of the breast and axilla and demonstrated multiple complex collections with associated hypervascular areas. The diagnosis with the correlation of ultrasound findings, drainage, Microbiology and Cytology, identified the abscesses and the cause. Some other differential diagnoses could include seroma and hematoma (if there was an interventional procedure or surgical history), abscess formation associated with mastitis (if the patient was breastfeeding), collection formation due to trauma or secondary to inflammatory changes in the skin (such as sebaceous cyst rupture) and definitive diagnosis can only be made by Cytology

Many forms of therapy are made available to HS patients, including pain management medications, dressing teaching sessions, weight loss, tobacco

cessation, and treatment for superimposed infections.[5] The first line of treatment options for HS included topical or oral antibiotic therapy.[5] More severe forms of HS render more aggressive therapeutic options, such as intralesional or systemic corticosteroids or partial/total excision of individual lesions and/or surrounding skin.[5] Due to the rarity of the HS condition, it is important to address the role of sonography for this particular case report.

Some important ultrasound techniques for obtaining optimal images to locate abscesses in patients with HS are using an abundant amount of sterile gel to prevent loss of contact and to optimize the visibility of superficial findings, such as the surface of the skin and the abscess's tracts' to the skin. Power Doppler is important to appreciate hypervascularity and inflammation in and around the collections. Panoramic imaging helps get an extended field of view to see the full extent of the collection more accurately (Figure 9). Tissue Harmonics Imaging was not utilized in this case due to the penetration needed due to body habitus. Dynamic Ultrasound imaging plays a useful role in appreciating the mobility and viscosity of the internal contents of the collections and helps in assessing the gauge of access needle for the drainage procedure. The patient's excruciating pain was a factor that made the exam and drainage technically difficult. It was important to address this issue by using minimal pressure and shortening the exam time as reasonably possible. Normally chlorhexidine is the common agent used for cleaning; however, in the case of this patient's open wounds and exposed mucous membranes, it was better to use betadine so that the patient would not feel a burning sensation from chlorhexidine.

Figure 9. Panoramic Image demonstrates abscess in the right breast lower outer quadrant.

Conclusion

A chronically ill patient with a flare-up from HS highlighted the importance of sonography in identifying associated subcutaneous collections and ultrasound-guided drainage sent to Microbiology and Cytology indicated the diagnosis that determined the best treatment option for the patient. The collaboration of many health care departments determined this patient's diagnosis and management. As a Sonographer, it's good to be aware that each patient will come in with different challenges, which may entail a change in the normal scanning protocol, and that being flexible will enable the best patient care and diagnostic images and aid in the diagnosis for that patient.

Acknowledgment

Images were used with permission obtained from chief privacy officer and director of medical imaging at Sunnybrook Health Sciences Centre.

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Article Title: The Role of Sonography in Managing Hidradenitis Suppurativa

Author Name: Jia Qian Lu, BMRSc, RDMS, CRGS, DMS

1. What is the prevalence for Hidradenitis Suppurativa (HS)?

1. 1%
2. 20%
3. 40%
4. 50%

2. What are common areas on the body HS tends to affect?

1. Scalp
2. Axillae
3. Inguinal Region
4. Inframammary folds
5. Abdominal folds/pannus
6. Gluteal and perianal areas

Choices:
a. 1,2,3,4,5
b. 3,4,5,6
c. 2,3,4,5,6
d. All of the above

3. What are some systemic comorbidities that are associated with HS?

1. Crohn's
2. Hypertension
3. Hyperglycemia
4. Rheumatoid Arthritis

Choices:
a. 1, 4
b. 1,2,3
c. 2,3,4
d. All of the above

4. What are some sonographic differential diagnoses for collections formed by HS?

a. Seroma
b. Abscess
c. Hematoma
d. Fibroadenoma
e. Sebaceous cyst rupture

5. This article suggests the best sonographic practice with patient with active HS is:

a. Use colour Doppler
b. Use power Doppler
c. Use more transducer pressure
d. Use higher frequency transducer

Ahmed Mohamed BSc
Jessica Routhier MRT (R)
Archana Thayanithy BSc
Junesa Wei BSc

Literature Review on the Impact of COVID-19 on the Mental Health of Diagnostic Imaging Professionals

About the Author

Ahmed Mohamed, Jessica Routhier, Archana Thayanithy & Junesa Wei are a team of students from the Ultrasound program at the Michener Institute of Education at UHN in Toronto, Ontario.

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ABSTRACT

Coronavirus 2019 (COVID-19) and its impact globally is the largest topic of discussion in all healthcare research communities. The purpose of this literature review was to understand the impact of COVID-19 on the mental health of diagnostic imaging professionals. This review identifies literature relevant to diagnostic imaging professionals. Comparison of articles from all over the world, survey results from various methods of data collection, factors causing mental health concerns, clinical problems, and study limitations inform this review to answer the question of whether and how COVID-19 has impacted the mental health of diagnostic imaging professionals. This limited review concludes that COVID-19 has negatively impacted the mental health of diagnostic imaging professionals, but there is little published information on this topic and more research needs to be done.

Keywords: COVID-19, Corona virus, diagnostic imaging professionals, mental health impact, pandemic, psychological wellbeing, radiologists, radiology, sonographers, and ultrasound.

Search Methodology

While compiling the information for this review, the following search methods were used. With the ongoing nature of this crisis and its related research, studies from all over the world were included, and no filters were required for the publishing years. The databases used in the data collection were PubMed, Google Scholar, and Sci-hub. Information was also gathered from reliable sources such as The World Health Organization and Sonography Canada. The key terms used in the search were COVID-19, diagnostic imaging professionals, mental health impact, pandemic, psychological wellbeing, radiologists, radiology, sonographers, and ultrasound.

Introduction

In December 2019, novel COVID-19 emerged in Wuhan, China, and was announced as a pandemic by the World Health Organization in March 2020.[1–5]

The rapid transmissibility of COVID-19 resulted in a sudden surge of patients, which quickly overburdened healthcare systems around the world.[4] This mobilized healthcare systems to adapt through reorganization to provide adequate COVID-19 treatment while maintaining essential health care.[4] Surveys from North America, Europe, China, and India reported that the COVID-19 outbreak had psychological impacts on Health Care Professionals (HCP), including significant experiences of stress, anxiety, depression, insomnia, and post-traumatic stress disorder (PTSD).[2,4–7] Similar experiences were found in other endemics, such as the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003.[6] With a growing number of studies on the psychological impacts of COVID-19 on all HCPs, this literature review focuses more specifically on the studies of the psychological effects of COVID-19 on diagnostic imaging professionals.

The professions under the diagnostic imaging department considered in this review include radiologists, X-ray technologists, CT technologists, and sonographers. Due to the high demand for these occupations, the subsequent increase in workload, and exposure to COVID-19, these HCPs faced a rise in work-related stresses.[7] Additional factors involved in causing mental health concerns for workers in the diagnostic imaging department include changes to the work environment, prolonged use of Personal Protective Equipment (PPE), fear of contracting the virus, the subsequent anxiety of transmitting it to loved ones, and the dwelling effect of the pandemic.[7,10]

Discussion

Upon retrieval and perusal of the relevant articles, it was noted that the main data collection method consisted of surveys using quantitative data and interviews with open-ended questions for qualitative research.[6,8,11] Survey collection methods included scales such as the Self-Rating Anxiety Scale, and the Connor-Davidson Resilience Scale.[5,8] Most surveys were completed within one month,[2,6,10,12] while some had a shorter duration of two weeks.[3,4] Some survey topics included the impact of COVID-19 on work, the impact of COVID-19 on educating radiology students and faculty, and innovative solutions to addressing pandemic challenges.[10]

Many factors contributed to the decline of mental health in diagnostic imaging professionals due to COVID-19. During the SARS outbreak, many workplaces experienced high levels of emotional stress, concerns about their personal and familial health, fears of infection, and feelings of rejection in their community due to the stigma around the virus.[5] Research on the long-term psychological impacts on diagnostic imaging professionals from SARS indicated that COVID-19 would have the potential to create a greater risk of developing psychological distress.[6] A large portion of the physical stress during the pandemic was related to the prolonged use of PPE.[6,7,11] Like SARS, the fear of contracting and transmitting the virus to loved ones concerned many diagnostic imaging professionals.[7,10] These incidences of fear increased with workers under 30 years of age and temporary staff members.[3] Since healthcare workers were exposed to high-stress environments for longer than a month, some literature suggested a risk of developing PTSD.[6,7] In addition, the longer quarantine periods increased the likelihood of post-outbreak depressive symptoms.[6]

Literature reported that the physical work environment contributed to the poor mental health of the diagnostic imaging professional. A significant increase in COVID-19 virus spread resulted in health care facilities cancelling elective examinations that were non-urgent in nature. This resulted in layoffs due to reduced workload.[1–4] As the pandemic evolved and virus spread became ongoing, additional barriers such as social distancing and physical barriers were used to reduce contamination. Each imaging examination took longer, impacting daily case volumes.[10] Smaller facilities like independent health facilities experienced a substantially low workload, resulting in a decreased sense of usefulness compared to public hospitals.[4,13] Private practice staff feared spreading

the virus in their small work environment[1,3]; however, staff in larger public hospitals feared contracting the virus due to the positive COVID-19 dense environment.[4] It was reported that feelings of fear also arose with unknown modifications to infection control protocol training, while the few who did receive prompt training experienced lower levels of fear.[1] Radiologists who transitioned from a live environment with staff and patient interaction to a remote environment working from home reported feelings of isolation and decreased job satisfaction.[2]

Literature has commented on multiple mental health challenges plaguing diagnostic imaging professionals during COVID-19. A systematic review by Muller et al. included HCPs such as doctors and nurses and found that many reported mental health issues including PTSD, burnout, depression, insomnia, and anxiety to a mild extent.[8] Florin et al. reported the following statistics of survey participants who experienced symptoms of each psychological outcome since the introduction of COVID-19; 40.9% insomnia, 35% anxiety, and 30.6% depression.[4] One study found heightened anxiety in women compared to men due to their obligations away from work.[2] Sonography Canada conducted a national mental health survey in 2018 and followed up in 2021. This survey assessed the mental health of sonographers in Canada and reported that sonographers are stressed, anxious, and depressed.[14] While 80% of sonographers reported being moderately or fully satisfied with their job, an equal percentage reported feeling depressed; 55% claimed that an increased workload had impacted their work performance, and 70% often or always found their work stressful.[14] In addition, 70% of respondents reported feeling anxious.[14] Most respondents had low feelings of personal accomplishment and high emotional exhaustion, which could ultimately lead to depersonalization and burnout in sonographers.[14] Sonographers' top concerns were general stress and burnout in the coming years.[14] While respondents showing signs of severe mental illness increased from 12% in 2018 to 20% in 2021; however, 63% of respondents indicated that they did not have access to, or were unsure about, the availability of workplace stress management/reduction programs.[14] Fear of contracting and spreading the virus to loved ones, fear surrounding unknown modifications to the infection control protocol, physical stress from prolonged use of PPE, declining feelings of usefulness and feelings of isolation all contribute to the negative psychological impact on imaging professionals.[1,2,4,6,7,10,11]

The Sonography Canada Survey findings and other literature emphasize that sonographers are suffering from mental distress and a lack of support.[2,14] At the same time, more studies stated that new and additional information could have been provided on stress management/reduction and mental health support programs.[1,6,11]

The limited information suggests that COVID-19 harms the mental health of imaging professionals, but the small sample group and low response rate do not make this a reliable finding and were duly reported as a limitation to these survey results.[2,4,6,11] The low response rate may be attributable to the reluctance of diagnostic imaging professionals to confess the need for mental health support.[3] Florin et al. noted that the low response rate decreased generalizability in the results,[4] but Muller et al. disagreed, pointing out that the data revolving around mental health shall not be generalized.[8] Huang et al. supported the theory that accurate results may not be possible due to the differences and changes in an individual's mental health over time.[5] Some authors noted that the various interpretation of the limitations of the results could lead to possibly inaccurate results.[3,6] Two studies agree that a limited description of each stressor results in differing interpretations.[6,11] In further research surveys, pre-defined definitions should exist to mitigate variability in question interpretation.[11] The report on COVID-19 and its negative impact on HCPs raises concern for the person suffering from this ailment and the patient being treated. Huang et al. have commented that healthcare workers' anxiety and other psychological problems can lead

to erroneous decision-making, which can impact the diagnosis and treatment of patients.[5] Timely and sufficient mental health support is stressed to mitigate the negative psychological impact of COVID-19 on diagnostic imaging professionals and prevent the worsening of any pre-existing psychiatric conditions.[1,6,10]

Conclusion

This limited review indicated that COVID-19 negatively impacts the mental health of diagnostic imaging professionals to varying degrees. The high-stress work environments, fear of contracting the virus, and universal precaution modifications have resulted in anxiety, depression, insomnia, PTSD, and burnout for the medical imaging professional. Timely and sufficient mental health support is necessary and should be available. More research on this topic would be valuable to inform and treat the imaging professionals whose mental health has been negatively impacted by COVID-19.

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Article Title: Literature Review on the Impact of COVID-19 on the Mental Health of Diagnostic Imaging Professionals

Authors' Name: Ahmed Mohamed, Jessica Routhier, Archana Thayanithy & Junesa Wei

Multiple Choice Questions Based on Literature Review

1. **Mental health supports are readily available from the workplace for all Health Care Professionals that suffer from stress and anxiety**
   a. True
   b. False

2. **Surveys from North America, Europe, China and India reported that the COVID-19 outbreak had psychological impacts to Health Care Professionals, including significant experiences of**
   a. Stress
   b. Insomnia
   c. Anxiety & depression
   d. Post-traumatic stress disorder
   e. All of the above

3. **Radiologists reported a decline in the mental health due to**
   a. Decrease sense of usefulness
   b. Fear of contracting the virus in a COVID-19 dense area
   c. Feeling of social isolation when sent to work remotely from home
   d. Cancellation of electives resulting in layoffs due to reduced workload

4. **What protocol implementation resulted in increased stress for the health care professional**
   a. Decreased workload
   b. Duration of COVID-19
   c. Social distancing guidelines
   d. Personal protection equipment

5. **A large portion of the physical stress during the pandemic was related to the**
   a. Use of barriers
   b. COVID-19 dense environment
   c. Prolonged use of social distancing
   d. Prolonged use of personal protective equipment
   e. All of the above

Susan Clarke

Results of the 2022 Sonography Canada Membership Survey

About the Author

Susan Clarke, Executive Director, Sonography Canada

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The success of a professional association depends on the level of satisfaction that members derive from the programs, services, and support provided.

A membership survey allows an association to obtain direct feedback from its members about what they want, need, and expect.

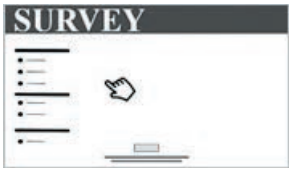
Collecting data is important but putting the data into action is what leads to meaningful change. For this reason, the results outlined in the following pages are key drivers guiding the strategic planning process for Sonography Canada for the next few years.

ASK. ANALYZE. ACT. These are the three A's that will hopefully earn us an 'A' as members grade our efforts and assess the value of being a member of Sonography Canada.

Overview

A bilingual online survey questionnaire was circulated to all Sonography Canada members between March 23 and April 19, 2022. A total of 947 responses were received from a potential 6,661 members, representing a response rate of 14%.

The survey asked many of the same questions as in the 2018 membership survey, with the addition of a few new ones addressing the current environment (e.g., the COVID pandemic and the expansion of regulation to Nova Scotia).



ASK
As a membership-driven association, member feedback is essential to guide the work of the organization.

ANALYZE
Collecting data is important but understanding what it means and being open to what it is saying is essential.

The membership survey was conducted to inform Sonography Canada's 2023-2026 strategic planning process and the activities that we will undertake in the next three years. Questions addressed employment expectations, working conditions, the impact of the COVID-19 pandemic, credentials, and overall satisfaction with key Sonography Canada membership features.

ACT
Once you ask and know, there is an expectation that action/change will follow. Sonography Canada is committed to achieving progress aligned with the member feedback received.

General

We received feedback from members across the country. Half were from Ontario, and the other half were from provinces and territories from coast to coast.

The data provides insight from members at various stages in their career. A total of 39% are veterans with more than 20 years in the profession. Also, 28% have 11 to 20 years of experience, 17% are 6 to 10 years into their careers, while 17% have recently begun (12% = 1 to 5 years; 5% = less than 1 year). This breakdown was very interesting considering that there was a fairly equal distribution of respondents in each of the age categories: 10% are 20-30 years of age, 25% are 31 to 40, 22% are 41 to 50, 27% are 51 to 60, and 14% said they are over 60.

Respondents also represented a cross-section of employment types, with approximately two-thirds (62%) working as full-time sonographers, 22% as part-time employees, 3% are students, and the remaining 13% have ceased active practice completely (retirement) or temporarily (on leave or have assumed a new role).

A strong majority (73%) of respondents identified as generalist sonographers, with 18% indicating cardiac sonography as their specialty area, 3% specified vascular sonography, and the remaining 6% stated that they did all types of scanning. Furthermore, 67% of participants reported they are practicing sonographers, with an additional 28% confirming that they hold supervisory or management roles. The remaining 6% are advancing the profession in education, research, or other ways.

The data also provides us with valuable insight from various work settings. Of those who completed the survey, 53% indicated that they work in hospitals, while 43% work in private clinics, 2% work in educational institutions, and the remaining 1% practice in other settings.

ASK. ANALYZE. ACT.

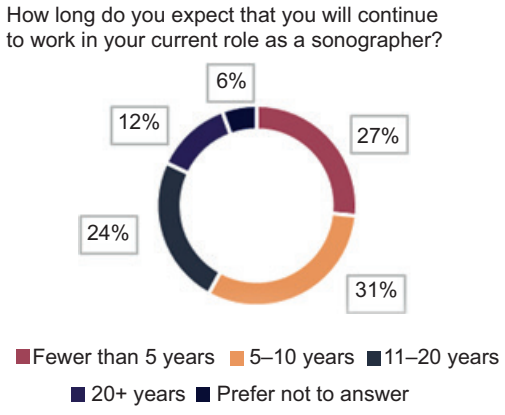
These are the three A's that allow Sonography Canada to put data into action.

Key conclusions

While we saw the needle move in certain areas since the 2018 edition of the membership survey was conducted, in many areas we saw very similar results. This can perhaps be attributed to the impacts of the COVID-19 pandemic that required both sonographers and Sonography Canada to shift their attention and efforts to adjust to the emerging issues and concerns of the time. Here is what members told us.

1. **We have some succession planning to do.**

   About one quarter (27%) of respondents indicated that they do not expect to be working in their current role in the next 5 years, and 76% of these individuals indicated that it's because they plan to retire. Also, an additional 31% plan



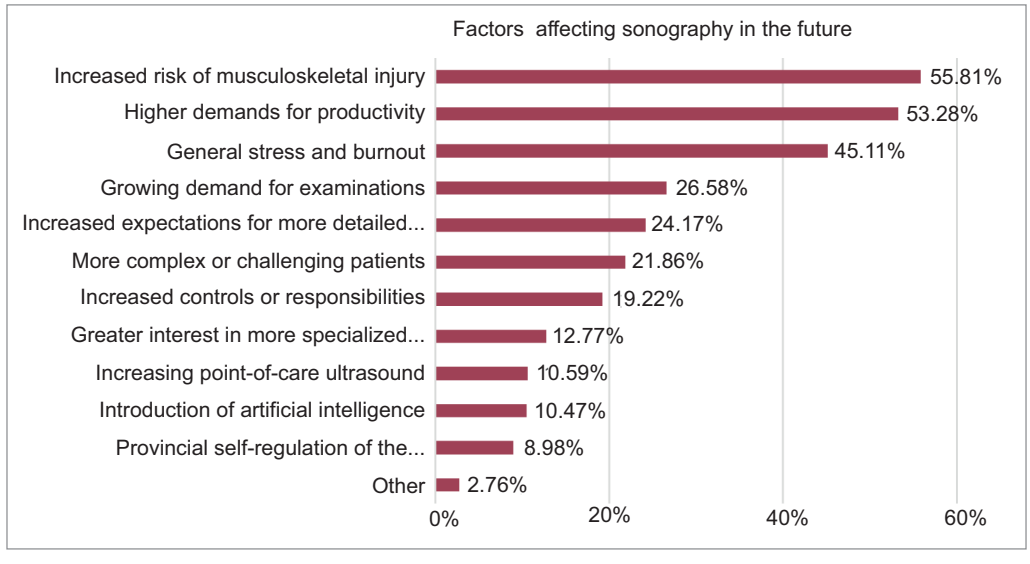
to leave their position in the next 5 to 10 years. While we have seen student members increase by about 15% annually, the profession is still left with a shortfall of sonographers. It's clear that we need to give some serious thought to how we can best increase the number of Canadians opting to make sonography their career choice and how we can bolster and influence the systems to provide them with the education and training they need.

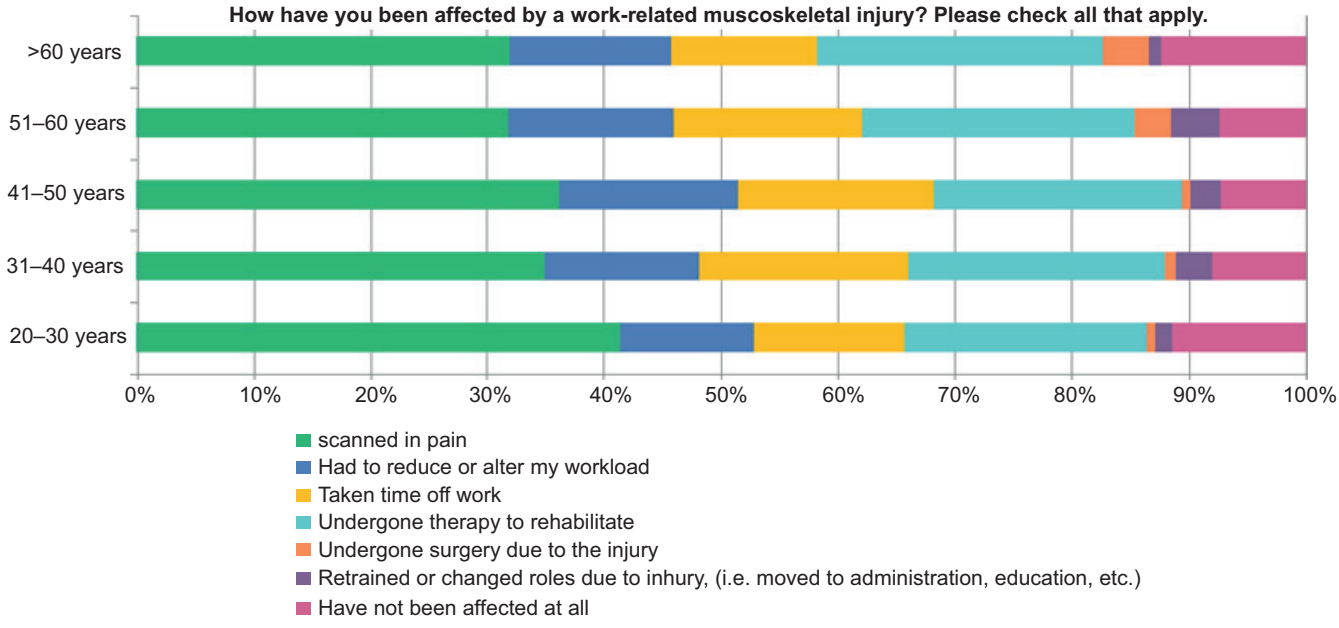
2. Member wellness must remain a key focus

With 56% of members expressing concerns about workplace injuries, 53% worrying about increased productivity demands, and 45% identifying general stress and burnout as the top three most important factors to affect sonographers in the future, Sonography Canada must look for meaningful ways to help improve the physical and mental health of the sonography workforce in Canada.

The top five factors sonographers see affecting the profession in the future have remained the same since 2018, but with a notable increase of over 10% related to general stress and burnout and a 10% decrease related to self-regulation. While older sonographers anticipate more complex or challenging patients, increasing controls and higher expectations for more detailed examinations, younger sonographers appear to be more concerned about the demands for productivity, general stress and burnout, and the risk of injury.

On this last point, younger sonographers have good reason to be concerned. The membership survey revealed that 83% of respondents have been affected by work-related musculoskeletal (MSK) injuries. Almost three quarters (69%) of these individuals indicated that they have scanned in pain. Interestingly, respondents in the 20–30 and over 60 age groups appear to have been impacted the least. See the figure below for other ways members have been affected by MSK injury:

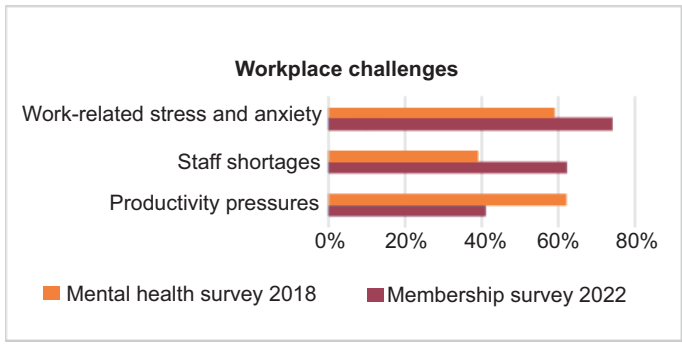




3. The pandemic put sustained pressure on sonographers

When asked how their professional life was affected by the COVID-19 pandemic, over half of respondents reported an increase in work-related stress and anxiety (74%), increased time spent on infection prevention and control protocols (71%), and staff shortages (62%). Over a quarter of all survey participants also cited productivity pressures to address patient wait times/backlogs (41%), increased patient conflict/complaints (34%), shift and scheduling issues (33%), and wage decreases or freezes (25%). Comparing these results to those of the mental health survey conducted in 2018, a number of these issues existed before the pandemic began but with some additional protocols and constraints, the pandemic appears to have exacerbated some of them.

Current working conditions have left sonographers ambivalent about the future, with about half (51%) believing the situation will worsen, but with the other half expecting the status quo (31%), improved conditions (7%), or simply feeling uncertain (12%) about what lies ahead for the profession. These results are very similar to those obtained in 2018. Sonographers continue to believe that it will take at least another 5 to 10 years to recover from the impacts of the recent pandemic and to undertake the concentrated efforts and lengthy process involved to influence and implement the operational changes required to address systemic issues in the diagnostic medical imaging sector and in the healthcare system as a whole. Sonography Canada is investigating steps to help mitigate these issues on behalf of its membership. More details will be available upon the release of our 2023-2026 Strategic Plan.



4. Sonography Canada offers strong membership value

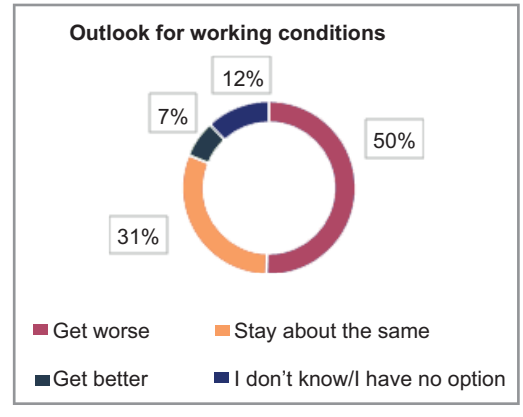
Over 90% of Sonography Canada members across the country are somewhat to very satisfied with the value of their Sonography Canada membership. It was interesting to note that the level of satisfaction increased with age. Perhaps this is because the level of engagement with the association increases as members acquire experience or tenure and become more actively involved as volunteers on committees, guest speakers, guest authors, etc. The survey revealed that 27% of Sonography Canada volunteers indicated being very satisfied with the value of their membership.

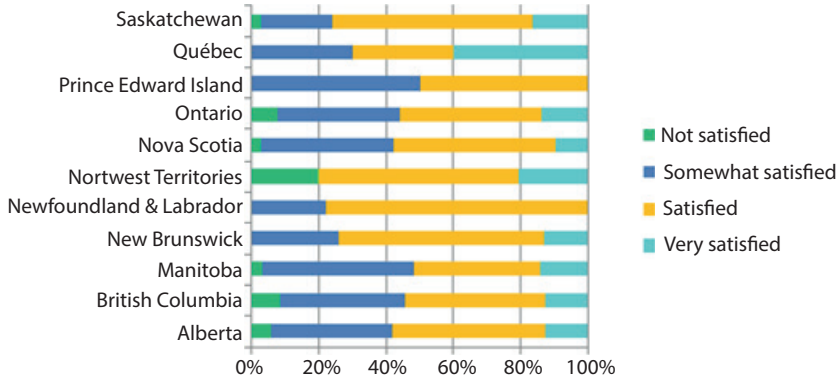
This survey aimed to determine what was important to members and, more importantly, to assess the association's ability to deliver on those membership benefits. Over 50% of survey participants identified the most valuable features: professional liability insurance, the online CPD video library, the right to use Sonography Canada credentials, professional practice standards and guidelines, monthly CPD webinars, and the *Canadian Journal of Medical Sonography* quizzes. These are essentially the same top 5 identified in 2018, plus the new monthly webinars, which are a welcomed addition since the last membership survey was conducted.

This is great news as these items are aligned with Sonography Canada's core functions as a national professional association and credentialing body. What was particularly gratifying to see is that over 90% of members feel that Sonography Canada is doing well or very well at delivering on the key membership features they value the most.

What is also clear is that members want Sonography Canada to advocate on behalf of the profession at a national level, particularly with employers. While advocacy is often defined as lobbying for and defending the rights of a group with government bodies, members would like the association to have further engagement with employers in order to achieve operational changes in the workplace. This result sparked important discussions during the strategic planning process.

The survey also confirmed the importance of keeping members informed of the association's activities. Much effort has gone into improving





member communications over the past few years and it was great to see the results confirming that we are headed in the right direction with 59% indicating we do a great job (an increase of 4% since the last survey) and an additional 36% thinking we do a fair job. Only 5% suggested that the association needed to improve significantly in this area.

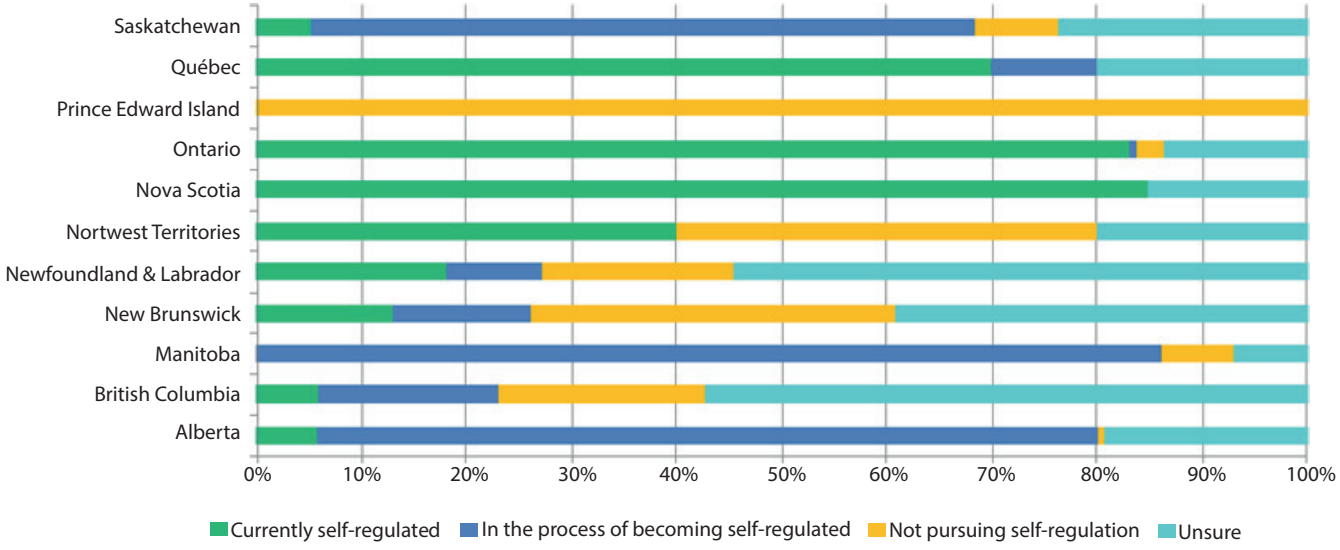
5. We must continue to advocate for the recognition of sonography as a unique and specialized healthcare profession

At the time of the survey, the only provinces with self-regulation in effect were Ontario, Nova Scotia, and Quebec. The survey results indicate a strong level of awareness of self-regulation by members in these provinces. However, over 1 in 10 were unsure how to answer the question or were incorrect in their understanding of the regulatory status of sonography in their region.

Credentials are an essential component to achieving the professionalization of sonography. A total of 95% of respondents confirmed holding one to four credentials, and an overwhelming majority of survey participants indicated that these credentials are very or somewhat valuable (93%). It's clear that members support having certification that confirms that an individual has met the national educational and competency requirements of the profession.

A total of 64% of survey participants stated that the reason they maintain their credentials is because it is required by their employer, but almost an equal amount (57%) indicated that they do so because of professional commitment and pride.

More than 40% felt credentials add credibility with patients or other professionals. This result was re-emphasized by member feedback suggesting that more could/should continue to be done to create a better appreciation for the unique skills and contributions of sonographers in the healthcare sector and to further recognize and create certifications for specialties in sonography.



Sonography Canada is committed to its mission to be the voice of diagnostic medical sonographers, fostering best practices, and promoting the pursuit of excellence. Healthcare may fall within the jurisdiction of provincial governments, but the profession of sonography transcends borders. In addressing issues identified in the membership survey with a strategic plan, our overarching goal will be to ensure that sonography is practiced in a consistent manner across the country, based on national competency profiles, high certification and practice standards, as well as regulation. Sonography Canada's 2023-2026 Strategic Plan is scheduled for completion in the fall of 2022, to be shared with members late this year.

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