The aim of the Hawai‘i Journal of Health & Social Welfare is to advance knowledge about health and social welfare, with a focus on the diverse peoples and unique environments of Hawai‘i and the Pacific region.

History:

In 1941, a journal then called The Hawai‘i Medical Journal was founded by the Hawai‘i Medical Association (HMA). The HMA had been incorporated in 1856 under the Hawaiian monarchy. In 2008, a separate journal called the Hawai‘i Journal of Public Health was established by a collaborative effort between the Hawai‘i State Department of Health and the University of Hawai‘i at Mānoa Office of Public Health Studies. In 2012, these two journals merged to form the Hawai‘i Journal of Medicine & Public Health, and this journal continued to be supported by the Hawai‘i State Department of Health and the John A. Burns School of Medicine.

In 2018, the number of partners providing financial backing for the journal expanded, and to reflect this expansion the name of the journal was changed in 2019 to the Hawai‘i Journal of Health & Social Welfare. The lead academic partners are now the six units of the UH College of Health Sciences and Social Welfare, including the John A. Burns School of Medicine, UH Public Health, the Thompson School of Social Work & Public Health, the School of Nursing and Dental Hygiene, the UH Cancer Center, and the Daniel K. Inouye College of Pharmacy. Other partners are the Hawai‘i State Department of Health and the UH Office of the Vice Chancellor for Research. The journal is fiscally managed by University Health Partners of Hawai‘i.

The aim of the columns of the Hawai‘i Journal of Health & Social Welfare is to provide a space for the entities that financially support the Hawai‘i Journal of Health & Social Welfare, the UH Office of the Vice Chancellor for Research, the Hawai‘i State Department of Health, and by advertising. However, the journal’s editorial board maintains editorial independence from these entities for the acceptance and publication of research articles. All editorial decisions regarding the selection and editing of research articles are made by the members of the journal’s editorial board. The decisions of the editorial board are not influenced by nor subject to the approval of these entities.

The aim of the columns of the HJH&SW is to provide a space for the entities that financially support the HJH&SW to disseminate information regarding their research, programs, goals, or current issues facing their respective fields. Columns are edited by the HJH&SW contributing editors, who are employees of the agencies that support the HJH&SW.

The aim of the Hawai‘i Journal Watch is to highlight recent research of the entities that financially support the HJH&SW. The research articles that are covered in the Hawai‘i Journal Watch are selected by both the HJH&SW and by researchers in the units that support the HJH&SW. The researchers whose articles are covered in the Hawai‘i Journal Watch are given the opportunity to fact check the news brief.
Case of Mycotic Coronary Aneurysm Treated with Percutaneous Coil Embolization

Shana Greif MD; Monika Bernas MD; John Cogan MD; and Omar Abdul Ghani MD

Abstract

Mycotic coronary aneurysms are rare, with potentially fatal complications. The treatment of choice is surgical intervention. We present a case of a mycotic coronary aneurysm secondary to a catheter-related bloodstream infection, failed surgical treatment, and eventual treatment with percutaneous coil embolization.

Keywords

Coronary aneurysm, mycotic aneurysm, coil embolization, coronary angiography, coronary bypass

Abbreviations and Acronyms

CAA = coronary artery aneurysm
CT = computed tomography
ECG = electrocardiogram
HD = hemodialysis
MCA = mycotic coronary aneurysm
MRSA = methicillin-resistant Staphylococcus aureus
TEE = transesophageal echocardiography
TTE = transthoracic echocardiography

Introduction

Coronary artery aneurysms (CAA) are a localized dilatation of a coronary artery segment and have a reported incidence of up to 5%. Most cases of CAA are asymptomatic and diagnosed incidentally on imaging. The underlying mechanisms leading to the formation of CAAs are not well understood. Proposed etiologies include Kawasaki disease, congenital causes, concomitant atherosclerotic coronary disease, and iatrogenic causes from intracoronary instrumentation. In contrast, mycotic coronary aneurysms (MCA), resulting from an underlying infection, are an exceedingly rare entity and have been reported to comprise less than 3% of all CAAs. Surgical intervention is the preferred treatment for MCAs.

Case Report

A 61-year-old man presented to the hospital with sepsis secondary to methicillin-resistant Staphylococcus aureus (MRSA) bloodstream infection. His medical history was notable for end-stage renal disease on hemodialysis (HD) via a left upper extremity arteriovenous fistula, diabetes mellitus type 2, hypertension, and hyperlipidemia.

The patient had multiple hospitalizations over 6 months for recurrent MRSA septicemia. His initial hospitalization was due to an infected left upper extremity arteriovenous fistula malfunctioning and required placement of a right internal jugular vein tunneled catheter. He was re-hospitalized 6 months later for recurrent MRSA sepsis secondary to infection originating from his right internal jugular tunneled catheter requiring catheter removal. During both hospitalizations, transthoracic echocardiography (TTE) studies were unremarkable. For each infection, the patient was treated with intravenous vancomycin for one month.

During his third admission, he was found to have persistent induration and mild tenderness around his former tunneled catheter site. Laboratory data was notable for elevated erythrocyte sedimentation rate >130 mm/hour (normal range, 0–20 mm/hour) and C-reactive protein 182.6 mg/L (normal range, 0–10 mg/L). Blood cultures again grew MRSA in 2 out of 2 sets.

Further workup was pursued with a transesophageal echocardiography (TEE). The TEE showed a well-circumscribed echolucent mass adjacent to the right atrium initially thought to be a possible abscess (Figure 1). Cardiac computed tomography (CT) scan showed a large distal right coronary artery aneurysm that was partially thrombosed and measured 4.7 x 5.2 x 3.9 cm (Figure 2). The aneurysm was suspected to be mycotic as the patient had a prior coronary angiogram 2 years earlier that did not show any evidence of an aneurysm. Cardiac catheterization confirmed a large aneurysm of the distal right coronary artery with complete occlusion of the distal artery and collateralization from the left coronary circulation (Figure 3).

Given the risk for rupture and persistently positive blood cultures, the patient was referred for surgical intervention. Intraoperative assessment of the coronary anatomy revealed that the aneurysm had an intramyocardial location with a slight bulge on the epicardial surface. Due to the aneurysm’s intramyocardial position, the risks of attempting surgical ligation were felt to be too high to proceed. Medical therapy alone would have been insufficient to mitigate the risk for rupture, so the decision was made to pursue percutaneous intervention. A covered stent could not be deployed across the aneurysm, as all anterograde flow in the right coronary artery terminated within the large aneurysm with no flow distally. He underwent successful percutaneous coiling of the coronary aneurysm with a total of 33 coils inserted into the aneurysm (Figure 4).
The patient tolerated the procedure well without complications. He was seen in the outpatient clinic after his procedure and continued to do well. His repeat blood cultures have been negative. He completed eight weeks of intravenous antibiotic therapy with vancomycin and currently remains on life-long oral doxycycline therapy.

**Discussion**

MCAs have been associated with cardiac complications, including myocardial infarction, rupture, fistula formation, pericardial effusion, or tamponade. First described in a post-mortem case by Morgagni in 1761, the reported cases of MCA have increased with the advent of CT imaging and coronary angiography. However, MCA remains an elusive entity, with most current knowledge derived from case reports. The largest systematic review to date by Baker et al found that MCA has a significant male predisposition (80.2%) and a predilection for the right coronary artery (40.6%) and left anterior descending artery (31.3%). The most common causative organism was *Staphylococcus aureus* (55.8%). End-stage renal disease was also noted to be a significant risk factor for MCA. The most commonly reported complications were myocardial infarction (39.8%), pericardial effusion (37.3%), and aneurysm rupture (28.9%). Less common complications included fistula formation (4.8%) and sinus node dysfunction (1.2%).

Currently, there are no established guidelines for the management of MCA. While antibiotic therapy alone may be sufficient to treat small aneurysms, larger aneurysms carry an increased risk for complications, such as rupture, and may require early invasive intervention. Surgery is the preferred approach to treatment due to the infectious nature of the aneurysm. Aneurysm resection and distal bypass is the most commonly pursued surgical method. Percutaneous intervention may be considered in addition to long-term antibiotic treatment in patients who are not surgical candidates. Percutaneous treatment options include placement of a covered stent across the affected segment of the coronary artery. Coil embolization has been previously described as a treatment option for non-infected CAA; however, there have been no published reports of its use for MCA, with this being the first published report.

This case illustrates a rare and challenging case of a large MCA that was not amenable to surgery and was successfully treated with percutaneous coil embolization.

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**Figure 1.** The mid-esophageal 4-chamber view on transesophageal echocardiography shows a well-circumscribed echo-lucent mass that appears to be situated adjacent to the right atrium or embedded in the myocardium. The initial differential diagnoses included abscess versus coronary aneurysm.
Figure 2. Cross-sectional view of the chest on computed tomography demonstrates a large distal right coronary artery aneurysm measuring 47 mm x 52 mm.

Figure 3. Right coronary angiography reveals a large aneurysm arising from the distal right coronary artery (traced in the green dotted line). There is no coronary flow beyond the aneurysm.
Conclusion

Mycotic coronary aneurysms represent a rare condition with potentially fatal complications. Due to the risk for rupture, early surgical intervention is the preferred management strategy. For cases in which the large aneurysm is not amenable to surgical intervention, percutaneous coil embolization may be considered an alternative treatment method with concomitant long-term antibiotic therapy.

Conflict of Interest

None of the authors identify any conflict of interest.

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References
A Rare Coexistence of Seminoma and Hodgkin’s Lymphoma in Hawai‘i

Zhaohui Liao Arter MD; Sanket Meghpara MD; Salvatore Mignano DO; and Jeffrey Berenberg MD

Abstract

Both Hodgkin’s lymphoma and testicular cancers can present in young men; however, concurrent Hodgkin’s lymphoma with seminoma is very rare. When they do coexist, careful consideration must be made to avoid missing new cancer by assuming the presence of primary metastatic disease when lymphadenopathy presents. Here we present a rare case of coexistence of seminoma and Hodgkin’s lymphoma and the staging and treatment challenges associated with a 2-cancer diagnosis.

Keywords
Hodgkin’s lymphoma, testicular cancer, seminoma, coexisting malignancies

Abbreviations and Acronyms

HL = Hodgkin’s lymphoma
CT = computerized tomography
PET = positron emission tomography
FNA = fine needle aspiration
BEP = bleomycin, etoposide, cisplatin
BV+AVD = brentuximab, vedotin, doxorubicin, vinblastine, and dacarbazine
TNMS = tumor, nodes, metastasis, serum biomarkers
ABVD = dexamethasone, bleomycin, vinblastine, and dacarbazine
EP = etoposide and cisplatin
LDH = lactate dehydrogenase
hCG = human chorionic gonadotropin
AFP = alpha-fetoprotein

Introduction

Testicular cancers are the most common solid tumor among young men aged 15 years to 34 years, estimating 5.6 cases per 100,000 persons per year. Among testicular cancer, germ cell tumors, including seminomas, make up 95% of all the cases. In the United States, Hodgkin’s lymphoma (HL) accounts for approximately 10% of all lymphomas and 0.6% of all cancers. HL has a bimodal age distribution, with a peak in late adolescence or young adulthood and a second peak in older adults.

Although both HL and germ cell tumors can present in young men, concurrent HL with seminoma is very rare. In the literature, there have been only a few reported cases. The clinical presentation for both malignancies is variable. This case demonstrates the diagnostic challenges posed and the clinical acumen and a full pathologic evaluation required to avoid a diagnostic error. Although both malignancies are chemotherapy-sensitive, the choice of regimens is different. Without any current guidelines, the therapeutic strategy can also be challenging.

Case Report

A 39-year-old active-duty man presented with new onset of right testicular discomfort for the past week after lifting weights. He denied any dysuria, penile discharge, fever, fatigue, weight loss, night sweats, or loss of appetite. His physical exam showed no palpable lymphadenopathy but was significant for a large, hard, tender right testicular mass. Scrotal ultrasound was positive for a hypervascular testicular mass. Orchiectomy revealed a 4.2-cm well-circumscribed testicular mass. Pathology showed a fibrous pseudocapsule; cells were arranged in diffuse, solid growth patterns with abundant intratumoral lymphocytes (Figure 1A). At high-power magnification, the tumor showed many large tumor cells with abundant clear to amphophilic cytoplasm, enlarged nuclei, and prominent macronucleoli (Figure 1B). These findings were diagnostic of pure seminoma. Lactate dehydrogenase (LDH), human chorionic gonadotropin (hCG), and alpha-fetoprotein (AFP) were within normal limits. Computed tomography (CT) of the neck, chest, abdomen, and pelvis revealed both an enlarged right external iliac and a left supraclavicular lymph node. Fine needle aspiration (FNA) of the left supraclavicular lymph node showed atypical cells suspicious for malignancy (Figure 1C and 1D) felt to be consistent with the diagnosis of seminoma (IIIA). Chemotherapy with bleomycin, etoposide, cisplatin (BEP) was initiated. An excisional biopsy of the supraclavicular lymph node was performed 9 days later. The final supraclavicular lymph node biopsy revealed classical Hodgkin lymphoma, lymphocyte rich subtype (Figure 1E and 1F). Immunohistochemical stains were performed. The neoplastic cells were positive for CD15, CD30, and weakly positive with PAX5 (Figure 1G). These cells were negative for CD3 (Figure 1H), CD20, and CD45, a characteristic but nonspecific feature of Hodgkin’s lymphomas. Staging positron emission tomography (PET)/CT showed lymphadenopathy in multiple locations, including supraclavicular, subcarinal, right external iliac, and right iliac bone lytic lesion (Figure 1I). Biopsy of the right iliac bone lesion was negative for malignancy. The patient continued therapy to complete a total of 3 cycles of BEP and repeat CT chest/abdomen/pelvis showed resolution of lymphadenopathy only at the right external iliac location.
Given the distribution of the lymphadenopathy and resolution of the adenopathy below the diaphragm following BEP treatment, the diagnosis of stage IIA seminoma coexistent with stage II Hodgkin’s lymphoma was confirmed. The patient was started on brentuximab vedotin in combination with doxorubicin, vinblastine, and dacarbazine (BV+AVD) for Hodgkin’s lymphoma with complete metabolic response on PET/CT after 4 cycles.

**Discussion**

Testicular cancer is usually staged using the TNMS system (tumor, nodes, metastasis, serum biomarkers) for an appropriate therapy regimen. Most patients with seminoma present with stage I disease, which is defined as local disease with no lymph node or distant metastases. Stage II disease is defined by retroperitoneal lymph node metastasis. In contrast, stage III disease is defined by distant metastasis. The incidence of neck metastases ranges from 2.6% to 4.5% for testicular primary germ cell tumors. Wood et al reported 31 patients with supradiaphragmatic nodal metastases from testicular primary germ cell tumors and found neck lymphadenopathy in 10 of 11 patients with seminoma (91%). The European Association of Urology recommends Radiation Therapy for IIA/IIB seminoma, with chemotherapy as an alternative. For stage IIC or III, chemotherapy with 3 cycles of BEP or 4 cycles of etoposide and cisplatin (EP) is recommended. Lymphadenopathy in a patient with known testicular cancer can be inappropriately assumed to represent metastatic disease since the coexistence of testicular cancer and lymphoma is very rare. Lymph node excisional biopsies are crucial for correct diagnosis, staging, and treatment in patients with coexistent seminoma with lymphoma, as illustrated in our case.

Selection of initial treatment for HL is usually based on presenting stage and prognostic factors. Both HL and germ cell tumors commonly involve lymph nodes, making staging more challenging, such as in our patient. Stage II HL involves 2 or more lymph node regions or lymph node structures on the same side of the diaphragm, while stage III HL involves lymph node regions or lymphoid structures on both sides of the diaphragm. Our patient’s right external iliac adenopathy resolved following BEP treatment, making the diagnosis of stage II HL more likely. Multiple clinical trials have studied the treatment strategy of combined modality therapy versus chemotherapy alone for HL. For patients with early-stage, favorable prognosis HL, combination chemotherapy with radiation therapy results in higher disease-free survival compared with chemotherapy alone. However, the overall survival is similar.
ABVD (adriamycin, bleomycin, vinblastine, and dacarbazine) remains the “gold standard” chemotherapy for stage I and stage II HL patients. In our case, the patient had already received 3 cycles of bleomycin-based chemotherapy for seminoma; hence, BV+AVD was chosen for HL instead of ABVD. In 1 case with the coexistence of seminoma and HL, the patient received chemotherapy for the seminoma followed by 6 cycles of ABVD for HL. Interim PET/CT showed complete response after 2 cycles.6

Even though both seminoma and HL are chemotherapy-sensitive, the choice of regimen is different, as discussed above. The sequence of chemotherapy for coexistent seminoma and HL depends on the individual malignancy’s staging and aggressiveness. In our patient, the atypical lymph node FNA result and the rarity of malignancy coexistence led to the missed diagnosis of HL. If HL was discovered earlier, we would have opted for ABVD for HL and radiation therapy for his seminoma instead of BEP for seminoma followed by BV+AVD for HL.

In conclusion, we present a rare coexistence of seminoma and HL. Further research is needed to guide treatment for synchronous malignancies.

The views expressed in this case report are those of the authors and do not reflect the official policy of the Department of the Army, Department of Defense, or the US Government.

Conflict of Interest

None of the authors identify a conflict of interest.

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References

Effect of Hometown Seasonality on Undergraduate Students’ Risk of Developing Seasonal Affective Disorder

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Abstract
Seasonal affective disorder (SAD) is a prevalent and potentially serious medical condition. Young adults are at particularly high risk. However, it is unknown if college students whose hometowns are in geographic areas with less seasonal variability, such as in the state of Hawai‘i, are particularly vulnerable if they attend schools in areas with seasonal variability. An adapted version of the Seasonal Patterns Assessment Questionnaire (SPAQ) was administered to students at 3 universities to test this hypothesis. Surveys were administered twice: a baseline (T0) assessment in the fall and a follow-up (T1) assessment in the winter and were administered in the second month of each semester. A linear regression model was constructed to identify potential risk factors for developing seasonal fluctuations in mood (SPAQ scores T1-T0). Study subjects (n=115) from non-seasonal hometowns had a 1.6-point greater increase in SPAQ score than students from seasonal hometowns (β = 1.73; standard error = 0.68; P =.012). Interestingly, SPAQ score changes of students from seasonal hometowns did not differ significantly from 0 (t = -0.97; P =.33), indicating that they did not generally experience seasonal shifts in depressive symptoms. Students from less seasonal hometowns and counselors at seasonal institutions should be aware that these students could be more at risk of developing depressive symptoms and address these concerns before interfering with students' daily and academic lives.

Keywords
seasonal depression, risk factors, seasonality, hometown environment, adjustment

Abbreviations and Acronyms
SAD = Seasonal Affective Disorder
SPAQ = Seasonal Patterns Assessment Questionnaire
AC = Amherst College
WU = University of Washington in St. Louis
UP = University of Portland
IRB = Institutional Review Board

Introduction
Major depressive disorder is the leading cause of disability in the United States for people aged 15 to 44 years, affecting an estimated 6.6% of the population each year with a lifetime prevalence of 16.2%. Major depressive disorder has been associated with poor quality of life and increased mortality due to suicide. Seasonal affective disorder (SAD) is a type of depression related to change in seasons, and most commonly, peaks during the winter months and wanes during the summer. SAD accounts for 10% to 20% of all recurrent depression, ranging from 9.7% in New Hampshire to 1.4% in Florida. Overall, 10% to 20% of patients diagnosed with SAD have mild cases, while 6% have severe symptoms that require hospitalization.

SAD is correlated more strongly with climatic variables than latitudinal position. Previous studies have found a strong, negative relationship between SAD prevalence, the number of wintertime daylight hours, and average daily temperature, and a strong, positive relationship between SAD prevalence and cloudiness. However, the leading predictor of the development of SAD is the reduction in sunlight exposure during winter due to shortened days or lifestyle changes. In fact, light therapy is being examined as a possible treatment for SAD.

The impact of other environmental and patient-specific factors on the development of SAD is poorly understood. Young adults are a particularly high-risk group for both major depression and SAD. A meta-analysis reported that 27.2% of medical students had depressive symptoms, with other studies found similarly elevated risk among college students. Interestingly, the impact of students groups of similar social or cultural identity, or affinity groups (eg, the Hawai‘i Club, Black Student Union, Asian Student Union, Gay-Straight Alliance), and the strength of social networks on the risk of developing SAD is unknown.

This student-initiated, student-led multicenter study investigated the relationship between SAD and a student’s hometown seasonal variability. We hypothesized that students from hometowns with less seasonal variation are more susceptible to seasonal depressive shifts in mood.

Methods
Study Population
College undergraduates at the 3 participating sites, Amherst College (AC) in Massachusetts, Washington University at St. Louis (WU) in Missouri, and Portland University (UP) in Oregon, were eligible for participation. Students were recruited during the second month of the fall semester in 2017 to ensure a warm climate and mitigate any carry-over effects of summer travel or adjustment back to school. These sites were selected due to co-investigator professional connections and for their diverse student bodies as well as their representation of dif-
ferent regions of the country, with 1 school in New England (AC), 1 in the Midwest (WU), and 1 in the Pacific Northwest (UP). Students were recruited by a co-investigator at each site through flyers, social media posts, word of mouth, and face-to-face recruiting. Students were asked to complete a baseline survey at enrollment and a follow-up survey the following spring. Participants were not compensated for their participation. Institutional Review Board (IRB) approval was obtained from each study site (IRB reference numbers: 16-020 at AC, 201709214 at WU, and 2017-0124 at UP).

Survey

An adapted version of the well-validated Seasonal Pattern Assessment Questionnaire (SPAQ) was used for our survey. The SPAQ is the most commonly used instrument to assess the risk of SAD, with respondents scoring higher on the instrument being at greater risk of developing SAD. Although not sensitive enough to be considered a diagnostic instrument for SAD, it is widely considered to be an accurate screening instrument, with good specificity (94%), modest sensitivity (44%), and sufficient ability to classify subjects (81% correctly classified).17,18

The SPAQ was adapted to make it a 2-step longitudinal survey asking participants to rate their current emotional state at 2 points in time rather than reflect on how they feel throughout changing seasons. The survey was administered twice: a baseline (T0) assessment in the fall and a follow-up (T1) assessment in the winter. Surveys were administered in the second month of each semester to mitigate the influence of early semester stress and pre-semester traveling. Change in SPAQ score was calculated by subtracting the fall from the winter score (T1-T0), with positive scores representing an increase in depressive symptoms and negative scores indicating an improvement.

Participants provided additional information on their demographics, lifestyle, and hometown characteristics. Hometown was defined as a student’s most recent place of residence before college. Lifestyle variables included self-reported measures on a 1 to 5 Likert Scale and included academic stress, the importance of affinity groups, and an estimate on the cultural similarity between a students’ school and their hometown. Hometown climate characteristics were derived based on the first 3 digits of the student’s hometown zip code. The Health Insurance Portability and Accountability Act of 1996 considers 3-digit zip codes to be non-identifiable information.19

Climate Variables

Hometown climate data were measured at ground-level weather stations and accessed through a free online repository.20 The primary measure of seasonality was hours of sunlight during winter months (December–February). Hours of sunlight were measured by ground sensors at select weather stations across the country and gives a more accurate measurement than the time between sunrise and sunset, as climate conditions such as cloudiness, rain, and fog can influence estimates. Due to the inherently bimodal nature of this variable, it was dichotomized into seasonal or non-seasonal categories with a threshold value of fewer than 550 hours of winter sunlight representing a seasonal hometown (Figure 1). Temperature variables were taken as monthly averages, with low temperature representing the lowest average monthly temperature and change in temperature representing the difference between the highest average monthly temperature and the lowest. Latitude measurements were also collected. Hometown climate was measured using the closest available weather station.

Data Analysis

The final analytic sample (n=115) included students who completed both surveys (baseline and follow-up), which was necessary because the primary outcome was a change in SPAQ scores. Students who failed to provide 3-digit hometown zip codes or resided in their hometown for less than 4 years were excluded. Students who scored greater than 16 on the baseline SPAQ survey (T0) indicating that they had a number of depressive symptoms at baseline were also excluded, as they met the screening criteria for the potential to be “very depressed” and were advised to follow up with their health care providers (n=45). For the primary analysis, SPAQ score changes were compared between students from seasonal and non-seasonal hometowns via 2-sample, 2-tailed Welch’s t-test. To identify independent factors associated with seasonal changes in SPAQ scores, we used multivariable linear regression with climate, demographic, and lifestyle variables as independent variables. Given the high number of correlated climate predictors and our emphasis on predicting which students would have winter variation in mood, we used least absolute shrinkage and selection operator (Lasso) variable selection to select the most relevant climate variables, minimize the consequences of overfitting, and address collinearity.21 Qualtrics Software was used for data collection (Qualtrics, Provo, USA), while R statistical software, version 3.4.1 for Mac, was used for data analytics (Vienna, Austria). Averages are expressed as mean ± standard deviation (SD) unless otherwise noted.

Results

Population and Hometown Characteristics

Overall, 323 students completed the fall (T0) survey (92 at AC, 101 at UP, 136 at WU). Forty-five students (13.9%) had SPAQ scores >16 and were excluded from our analysis. Of the remaining 278 subjects, 115 (41.4%) completed the spring (T1) survey and comprised our final analytic cohort. Compared with the 115 students who completed the spring survey, the 165 who did not were similar in their fall SPAQ score and baseline characteristics (P = .67).
As expected, the average hours of sunlight months in seasonal and non-seasonal hometowns significantly differed (393 ± 16 vs 619 ± 16 hours; P < .001). Similarly, the latitude of seasonal and non-seasonal hometowns significantly differed (41.8 ± 2.3 vs 29.1 ± 2.3 degrees; P < .001), the average low temperature (-0.46 ± 43 vs 15.9 ± 2.4°C; P < .001) was significantly lower for seasonal than non-seasonal hometowns, and the seasonal change in temperature was higher (27.9 ± 0.9 vs 13.8 ± 2.4°C; P < .001; Table 1).

A total of 38 students at AC, 29 students at the UP, and 48 from the WU completed both surveys. There were no significant differences between student respondents at each site regarding gender, year in school, and minority status. Students from WU had an average baseline SPAQ score (9.71 ± 2.65) that was significantly lower than for students at AC (11.7 ± 3.07; P = .002) and UP (12.8 ± 1.94; P < .001). Baseline SPAQ scores did not differ between students from AC and UP (P = .09).

Although slightly more respondents (60%) were from seasonal rather than non-seasonal hometowns, the proportion of first-year students, men, and those who self-identified as a racial/ethnic minority was statistically similar between the 2 groups. In contrast, students from non-seasonal hometowns were significantly more likely to be involved in multiple affinity groups and strongly influenced by them and significantly less likely to report that their closest friends share a similar background (Table 2).

**Seasonal Change in SPAQ**

Baseline (fall) SPAQ scores were similar between the 2 groups (10.9 ± 3.1 vs 11.4 ± 2.7; P = .40; Table 2). Study subjects from non-seasonal hometowns had a 1.6-point greater increase in SPAQ score than students from seasonal hometowns (-0.26 ± 3.88 vs 1.35 ± 3.03; P = .01). SPAQ score changes of students from seasonal hometowns did not differ significantly from 0 (t = -0.97; P = .33), indicating that they did not generally experience seasonal shifts in depressive symptoms (Figure 2).

After linear regression adjustment for student demographics, lifestyle, and hometown characteristics, the difference in SPAQ score between students from non-seasonal and seasonal hometowns remained significant and similar in magnitude (β = 1.73; standard error = 0.68; P = .012). This finding indicates the difference in score is independent of other predictors (Table 3).

**Climate, Demographic, and Lifestyle Variables**

Because our primary definition of seasonal hometown was based solely on hours of sunlight per day, we sought to determine the influence of other climate variables on SPAQ scores. None of the average climate variables, such as temperature, latitude, or rainfall, were significantly related to our outcome and were not included in the final model.
Table 1. Seasonal Variability Between Seasonal and Non-Seasonal Hometowns

<table>
<thead>
<tr>
<th>Variables*</th>
<th>Seasonal Hometown (Mean (95% CI))</th>
<th>Non-Seasonal Hometown (Mean (95% CI))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average hours of sunlight during winter months, hours</td>
<td>393 (377, 409)</td>
<td>619 (603, 635)</td>
</tr>
<tr>
<td>Average latitude</td>
<td>41.8 (40.6, 43.1)</td>
<td>29.1 (26.8, 31.5)</td>
</tr>
<tr>
<td>Average low temperature during winter months, degrees Fahrenheit</td>
<td>-0.46 (-1.16, 0.65)</td>
<td>15.9 (13.4, 18.3)</td>
</tr>
<tr>
<td>Average temperature change during winter months, degrees Fahrenheit</td>
<td>27.9 (27.0, 28.8)</td>
<td>14.8 (12.3, 17.2)</td>
</tr>
</tbody>
</table>

Abbreviation: CI, confidence interval. *All variables were significantly different at \(P < .001\).

Table 2. Study Demographic Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Seasonal Hometown (n= 69) n (%)</th>
<th>Non-Seasonal Hometown (n=46) n (%)</th>
<th>(P) value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-year students</td>
<td>17 (24.6)</td>
<td>8 (17.4)</td>
<td>.49</td>
</tr>
<tr>
<td>Men</td>
<td>18 (26.1)</td>
<td>14 (30.4)</td>
<td>.67</td>
</tr>
<tr>
<td>Self-identifying as minorities</td>
<td>14 (20.2)</td>
<td>11 (23.9)</td>
<td>.65</td>
</tr>
<tr>
<td>Reporting high stress</td>
<td>33 (47.8)</td>
<td>23 (50.0)</td>
<td>.85</td>
</tr>
<tr>
<td>Involved in multiple affinity groups</td>
<td>15 (21.7)</td>
<td>18 (39.1)</td>
<td>.06</td>
</tr>
<tr>
<td>Report strong influence of affinity groups</td>
<td>19 (27.5)</td>
<td>25 (54.3)</td>
<td>.01*</td>
</tr>
<tr>
<td>Consider their close friends to share a similar background</td>
<td>31 (44.9)</td>
<td>43 (93.5)</td>
<td>&lt;.01*</td>
</tr>
<tr>
<td>Fall SPAQ score, mean (SD)</td>
<td>10.9 (3.06)</td>
<td>11.4 (2.69)</td>
<td>.67</td>
</tr>
</tbody>
</table>

Abbreviation: SD, standard deviation; SPAQ, Seasonal Pattern Assessment Questionnaire. *Asterisk represents values in the non-seasonal hometown column are significantly different from seasonal hometown at \(P < .05\). +Presented as number and percentage unless otherwise noted.

Figure 2. Change in SPAQ Score From Fall to Winter.
Students whose hometowns were non-seasonal (eg, Hawai’i), experienced greater increases in modified SPAQ score on average than their peers from seasonal hometowns (eg, Boston). This observed difference remained significant even after adjustment for climate, demographic and lifestyle covariates via multivariable linear regression (\(\beta = 1.73\); standard error = 0.68; \(P = 0.012\)).
### Table 3. Linear Regression Model Depicting Differences in SPAQ Score After Controlling for Lifestyle and Demographic Factors

<table>
<thead>
<tr>
<th>Variables*</th>
<th>Model Coefficient (Change in SPAQ Score)</th>
<th>Standard Error</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-seasonal hometown</td>
<td>1.73</td>
<td>0.68</td>
<td>.012</td>
</tr>
<tr>
<td>First-year students</td>
<td>-2.42</td>
<td>0.83</td>
<td>.004</td>
</tr>
<tr>
<td>Stress (Scale -2, 2)</td>
<td>1.73</td>
<td>0.30</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Involved in affinity groups</td>
<td>-1.04</td>
<td>0.87</td>
<td>.23</td>
</tr>
<tr>
<td>Report strong influence of affinity groups</td>
<td>2.00</td>
<td>0.83</td>
<td>.02</td>
</tr>
<tr>
<td>Consider their close friends to share a similar background</td>
<td>1.06</td>
<td>0.68</td>
<td>.12</td>
</tr>
<tr>
<td>Self-identify as a minority</td>
<td>0.14</td>
<td>0.79</td>
<td>.85</td>
</tr>
<tr>
<td>Men</td>
<td>1.19</td>
<td>0.70</td>
<td>.09</td>
</tr>
</tbody>
</table>

**Model Performance**

- Observations: 115
- $R^2$: 0.424
- Residual Standard Error: 3.033 (df = 83)

Abbreviation: df, degrees of freedom; Lasso, least absolute shrinkage and selection operator; SPAQ, Seasonal Pattern Assessment Questionnaire.

* Variables were selected via Lasso variable selection methods designed to identify the most powerful of the candidate predictors in a setting of suspected and known collinearity.

Aside from the school year, no demographic variables, including minority racial status and gender, were significantly related to changes in depression scores, and so they were not included in our final model. First-year students had average SPAQ change scores lower than upper-level students, indicating fewer depressive symptoms in the winter ($\beta = -2.42; \ P = .004$).

In contrast, lifestyle and cultural variables were generally very powerful predictors. Students reporting higher levels of stress in their follow-up survey scored higher than those who reported little to no stress ($\beta = 1.73; \ P < .001$). Thus, students who are stressed are more likely to report an increase in depressive symptoms in the winter when compared to their fall survey. Overall, students involved in affinity groups tended to have fewer depressive symptoms (mean difference, -1.04; $\ P = .23$); however, respondents who stated that these affinity groups had a “very significant” impact on their daily lives tended to have more depressive symptoms (mean difference, 2.00; $\ P = .02$). The variable “do your close friends share a similar culture to you” was included in the model as it added predictive power but was not significant (mean difference, 1.06; $\ P = .12$). More detail can be found in Table 3.

### Discussion

Seasonal shifts in SPAQ depression scores are present and prevalent on college campuses. In this study of college undergraduates from 3 diverse schools representing the Northeast, Northwest, and Midwest, nearly half of all respondents had an increase in SPAQ score, indicating more depressive symptoms. This finding was true for each of the 3 institutions that participated in the study, suggesting that seasonal mood changes are a widespread phenomenon that may affect students across various environments.

Hometown seasonality, defined as seasonal or non-seasonal depending on the hours of sunlight during the winter months, has a statistically significant effect on SPAQ score changes. Students whose hometowns are less seasonal (eg, Hawai’i) tended to report an increase in depressive symptoms in the winter, whereas those from more seasonal climates did not. This conclusion aligns with our hypothesis that students from less seasonal hometowns are at higher risk of developing seasonal depression. It also suggests that susceptibility to SAD has an acquired component based on the climate of the previous residence.

The strength of this study is its examination of changes in SPAQ scores among college students across three geographically diverse campuses. Prior studies have shown that communities at higher latitudes are more resistant to SAD and that certain groups have a more difficult transition to new environments, especially colleges. While seasonal affective disorder is well-documented, particularly its prevalence in young adults, most studies use only participants’ current residence. Two prior studies have examined the relationship between prior resistance and SAD, 1 comparing Japanese residents in Northern Europe to South East Asia and 1 comparing African students attending university in Washington, DC to their African American peers. Both studies, however, consisted of populations that were older than the average American college student (the DC study had an average age of 29.5 years for their African American control group and 30.5 years for their African student group). Moreover, both studies were subject to a much greater level of confounding than our study, as their groups had vastly different cultural experiences. Finally, African students from the DC study were from hometowns of equivalent latitudes to their university, suggesting their fluctuations in wintertime sunlight may not vary significantly. Given the geographical diversity but relative
cultural homogeneity between our seasonal and non-seasonal groups, this study is more specific to the influence of hometown climate and generalizable to those experiencing a less drastic cultural change.

There are several limitations to our study. First, we used an adapted SPAQ survey to estimate the change in depressive symptoms at 2 points in time. While our assessment had the advantage of not relying on participant’s self-assessment of their mood over the prior year, there are no well-defined cutoff points to identify participants with SAD. Thus our tool cannot be used to diagnose this disease. SAD diagnosis can only be made through clinical evaluation and reoccurrence of symptoms over several years and therefore is impossible in this study’s timeframe. Thus, our study focused on changes in SPAQ scores rather than assessing the prevalence of SAD. This finding is still a clinically meaningful observation, as pre- or sub-SAD fluctuations in mood can have profound lifestyle effects. Second, there may be other unmeasured factors driving the observed changes in SPAQ score. For instance, differences in seasonal mood changes could stem from the fact that those from non-seasonal hometowns are farther from home and less likely to have traveled home to visit family during the school year. However, even if these findings had some non-climate related origin, it is important to identify this population as distinct and potentially at higher risk.

In conclusion, students from non-seasonal hometowns appear to experience greater seasonal shifts in mood, even after controlling for demographic and lifestyle factors. We found that nearly 50% of students from non-seasonal hometowns reported an increased SPAQ score in the winter, compared to no change for those with non-seasonal hometowns. Moreover, adaptive factors appeared to affect seasonal mood changes. This conclusion suggests that increasing awareness in students from non-seasonal hometowns and their college community of the potential for seasonal mood swings may be important. Further study is needed to determine whether susceptibility to seasonal mood swings has an acquired component based on the climate of the previous residence.

Conflict of Interest

None of the authors identify any conflicts of interest.

References

Advocating For a Culture of Support for Lactating Medical Residents in Hawaiʻi

Kara Wong Ramsey MD; Nina Beckwith MD; Lindsey Heathcock MD; Theresa Myers MD; Venkataraman Balaraman MBBS

In 1993, the Medical School Hotline was founded by Satoru Izutsu PhD (former vice-dean UH JABSOM), it is a monthly column from the University of Hawai‘i John A. Burns School of Medicine and is edited by Kathleen Kihmm Connolly PhD; HJH&SW Contributing Editor.

Abstract

Lactating medical residents face unique barriers due to intense clinical work schedules, limited support in the clinic and hospital workspaces, and competing pressures between career development and childcare. The objective of this project was to explore the perceived culture of breastfeeding support among medical trainees and design an action plan to improve support for lactating residents in Hawai‘i. Resident and faculty representatives from the Hawai‘i Residency Programs and the University of Hawai‘i John A Burns School of Medicine participated in an 8 month national learning collaborative to review the existing resident lactation policy and resident perception of lactation support.

In a pre-survey, the majority of residents (88%) agreed that 20-30 minutes every 2-3 hours should be allowed to express milk but only 18% felt comfortable asking for a change in schedule to accommodate time to pump. An action plan was created with the following objectives: (1) revamping the existing policy to address protected pumping times, lactation spaces, and responsibilities of administration, faculty, and residents; (2) improving lactation space through uniform provision of educational material on available facilities and efficiency tips for new parents, and (3) improving awareness of the unique challenges lactating residents face and empowering faculty and trainees to advocate for lactating residents through department and educational presentations. Medical residents in Hawai‘i recognize the importance of breastfeeding but perceive a lack of support in the workplace. A comprehensive action plan to revamp the resident lactation policy and improve faculty and resident education may foster an increased culture of lactation support and healthy development of the physician workforce.

Introduction

“Liquid gold”, the thick golden colored Colostrum produced in the first few days post-partum for a new parent before their breast milk matures to an opaque white color, is aptly named for the valuable precious benefits for both baby and parent. Infants who receive breast milk have reduced risk for sudden infant death syndrome (SIDS), respiratory or gastrointestinal infections, allergies, asthma, and obesity. Lactating persons have reduced risk of breast and ovarian cancer, type 2 diabetes, and hypertension. Thus, major medical organizations including the American Academy of Pediatrics (AAP) and American College of Obstetrics and Gynecologists (ACOG) recommend that infants exclusively receive breast milk for their first 6 months and continue breastfeeding for at least the first year of life.1,2

Medical students and resident physicians (defined as individuals with an MD, DO or MBSS degree who are participating in a graduate medical education program) are educated about these benefits of breastfeeding during their training and are expected to support lactating patients. However, many fall short of meeting these recommendations when it comes to their personal lactation goals and experiences. A 2018 study of 927 members of the AAP Section on Medical Students, Residents, and Fellow Trainees found that the 33% did not meet their goal for exclusive breast milk and 24% did not meet their lactation duration goal due to the intense work schedules of residency, lack of perceived support among peers and staff, and feelings of guilt from conflicting expectations between career development and infant support.3 Similarly, another survey of resident physicians in 2020 revealed that 73% felt residency limited their ability to lactate, 37% stopped before their goal, and 40% reported that faculty and peers made them feel guilty for their decision to lactate.4

Like many states, Hawai‘i law entitles all employees to reasonable break times during the workday to express milk for 1 year after the birth of a child and to a private, non-bathroom space to express milk. However, the practical logistics of achieving these legal rights is left to the employer. The Hawai‘i Residency Program, which comprises the largest graduate medical education residency programs in the state of Hawai‘i, has only has a two-sentence lactation policy in its resident handbook that simply states, “For up to one year after the child’s birth, any resident who is breastfeeding her child may take breaks to express breastmilk for her newborn. [Contact Human Resources for information].” Additionally, the diversity of health care systems involved as training sites for residents adds a degree of complexity to this issue from the perspective of space sharing with other staff. The aim of this project was to explore the perceived culture of breastfeeding support among Hawai‘i Residency Program
resident physicians and design an action plan to improve support for lactating residents based on the American Academy of Family Physicians Model Policy Breastfeeding and Lactation for Medical trainees.³

**Methods**

Kapi’olani Medical Center for Women and Children (KMCWC), a major training hospital site for the Hawai’i Residency Program, was one of 10 medical residency institutions selected to participate in an 8 month learning collaborative “Supporting Breastfeeding Medical Residents Project” sponsored by the AAP and the American Academy of Family Practice. The goal of the program was to evaluate each site’s written policy and culture around breastfeeding support for trainees through anonymous resident surveys and facilitate each site’s creation of an action plan for improvement. The KMCWC local collaborative group was composed of resident representatives from pediatrics, obstetrics and gynecology, and family medicine residency programs (which comprise the majority of residency programs utilizing KMCWC as a training hospital site) as well as a faculty member from the University of Hawai’i John A Burns School of Medicine Department of Pediatrics and administrative member from the Hawai’i Residency Program.

A pre-work survey link provided by the learning collaborative was distributed to all residents from the pediatrics, obstetrics and gynecology, and family medicine residency programs (which comprise the majority of residency programs utilizing KMCWC as a training hospital site) as well as a faculty member from the University of Hawai’i John A Burns School of Medicine Department of Pediatrics and administrative member from the Hawai’i Residency Program.

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**Results**

**Pre-work Survey Results**

Thirty-three resident physicians from the Hawai’i Residency Program completed the pre-work survey, including 7 from obstetrics and gynecology, 18 from pediatrics, and 8 from family medicine. Thirty-six percent were aware of the resident lactation policy and 58% knew who to contact if they or another resident had breastfeeding/pumping needs. While 88% agreed that medical residents should be allowed to take 20-30 minutes every 2-3 hours to express milk, only 18% felt that they or another resident who had breastfeeding/pumping needs would feel comfortable asking for a change in their schedule to accommodate time to pump. Of the respondents, 18% had personal experience breastfeeding or pumping. Of those with experience, 83% of them pumped or breastfed during residency and met their personal breastfeeding goals.

**KMCWC Action Plan**

**Revised Resident Lactation Policy**

A suggested revised lactation policy was submitted to the Hawai’i Residency Program Graduate Medical Education Council for consideration. The revised policy significantly expanded upon the existing two-sentence policy in the resident handbook to a more comprehensive policy document, which defines minimum times for protected breaks, minimal components of lactation space, and outlined specific responsibilities for program administrators, supervisors, and trainees. This document was reviewed and approved by the Graduate Medical Education council and will be included in the resident handbook. The updated handbook is provided to every resident annually.

**Improved Efficiency of Lactation Space**

A document was created to be given to residents, which provides practical tips to achieve success in lactation during residency, including suggested supplies and tools such as hands-free breast pump accessories that allow residents to multi-task discreetly, milk storage tips, and links to local lactation consultant resources. The KMCWC group continues to collaborate with residents from other programs to create a comprehensive listing of lactation spaces available at various Hawai’i Residency Program training sites based on feedback from residents. The hope is chief residents will provide these documents to all residents, especially those returning from maternity leave and planning to continue lactating during their training.

**Improved Culture of Support: Faculty and Resident Education**

The KMCWC group created a 20 minute presentation that outlines the unique barriers to lactation success that medical residents face. The presentation also includes our tips on how faculty, staff, and other residents can be pro-active in fostering a culture of support by finding creative ways for clinical coverage during pump breaks. For example, checking-in with the resident regarding preferred pump schedule timing, altering the start time or flow of medical rounds, offering to hold pagers, and being cognizant of offering breaks during prolonged uninterrupted work periods, such as extended rounds or surgical cases. This presentation was given at multiple resident and faculty meetings in the John A. Burns School of Medicine Departments of Pediatrics, Obstetrics, Gynecology, and Women’s Health, and Family Medicine and Community Health in the inaugural year with hopes of continuing annually. The hope is also to provide a brief educational presentation each year at the annual resident orientation.
Conclusion

While medical residents in Hawai‘i recognize the importance of breastfeeding, a majority do not feel there is adequate support in the workplace conducive to achieving success in lactation. Such perceptions of inadequate support in the clinical training environment are similar to survey results published from other US institutions.\textsuperscript{3,4} Conflicting pressures between lactation and clinical demands are a significant stressor for medical trainees who face significant barriers to achieve lactation success. Through a comprehensive action plan to revamp the resident lactation policy and improve faculty and resident education, the goal is to foster an increased culture of lactation support for medical residents in Hawai‘i. Supporting lactating residents is essential to the healthy development of the physician workforce as the proportion of women in the physicians has increased from only 28.3% in 2007 to 36.3% in 2019.\textsuperscript{6} Additionally, a greater number of female medical resident trainees are planning to become pregnant (from 13% in 1983 to 30% in 2016).\textsuperscript{7} The number of female medical resident trainees choosing to become pregnant and breastfeed during training may be expected to rise further as greater attention has been called to the problems with fertility among physician women who choose to delay their pregnancies beyond training.\textsuperscript{8} Furthermore, physicians who are successful in their own personal lactation goals are more likely to promote breastfeeding for their patients and families. This practice benefits both physician and non-physician parents, their children and families. In promoting a culture of support for breastfeeding in the Hawai‘i community, physician faculty and medical education leadership must commit to not only “talking the talk” in clinical didactics for trainees on breastfeeding benefits but also “walking the walk”: check in regularly with lactating colleagues or trainees to see how they are doing and create a safe, protected space for lactation breaks in the clinical training site. Anyone interested in joining the mission of advocacy for lactating medical trainees are invited to contact the authors.

Acknowledgements

The authors acknowledge the 9 other university systems that participated in this project, the American Academy of Pediatrics (AAP) who coordinated the project and selected us as participants, and the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) who funded the AAP to organize this pilot project.

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