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EDITORIAL COMMENTARY

Michael J. Meagher MD, FACR and Tonya Lowery St. John MPH

180

SHOULD PERIPHERAL VASCULAR DISEASE- OR DIABETES-RELATED AMPUTATION CONTRAINDICATE RENAL TRANSPLANT?

Nalani L. Grace MD and Linda L. Wong MD

181

EVALUATION OF THE NATIONAL KIDNEY FOUNDATION OF HAWAII'S KIDNEY EARLY DETECTION SCREENING PROGRAM

Merle R. Kataoka-Yahiro DrPH, MSN, APRN; Kamomilani Anduha Wong MSN, APRN, FNP-BC; Jill Tamashiro MPH, OT; Victoria Page RN, BSN; Julaine Ching MSN, BSN, RN-BC; and Dongmei Li PhD

186

TAKOTSUBO CARDIOMYOPATHY IN THE SETTING OF ACUTE ALCOHOL WITHDRAWAL

Brian J. Stout MD; Reid Hoshida BS; and Dale S. Vincent MD

193

PUBLIC HEALTH HOTLINE

Environmental Contamination and Public Health: The Kilauea Story

Fenix Grange MS; Barbara Brooks PhD; Yesid Romero MD, PhD; and Gary Gill

195

MEDICAL SCHOOL HOTLINE

Role of the Health Sciences Library at the John A. Burns School of Medicine in Medical Education

Virginia M. Tanji MSLS, MEd and Leah R. Gazan MLISc

199

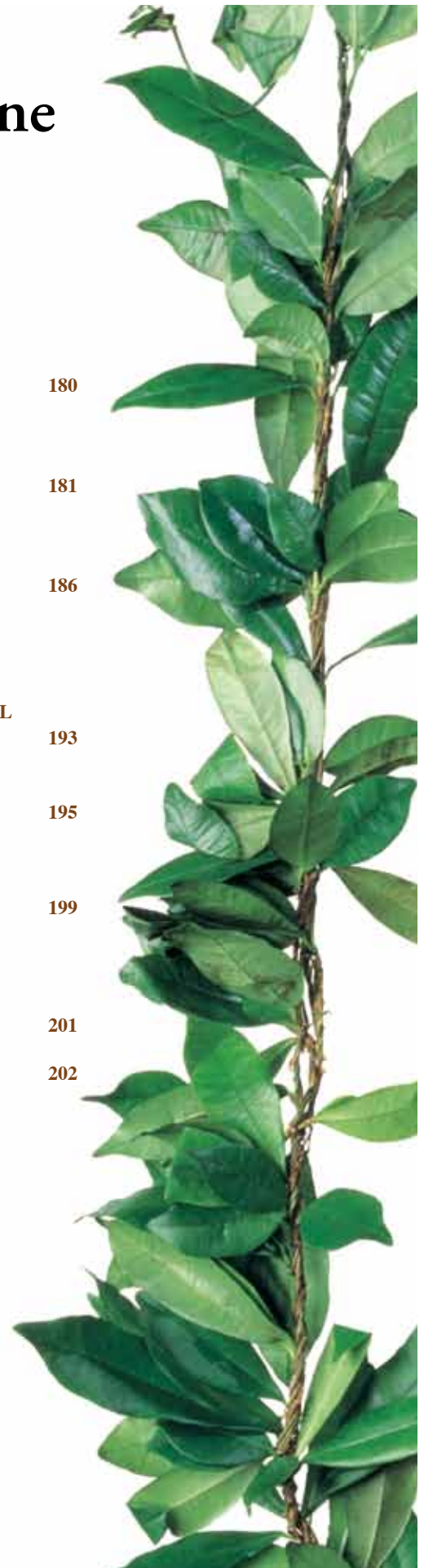
CME LISTING

201

THE WEATHERVANE

Russell T. Stodd MD

202



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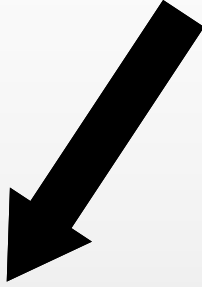
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Editorial Commentary

Michael J. Meagher MD, FACR;
Co-editor and Tonya Lowery St. John MPH;
Public Health Manuscript Co-editor

Two articles in this issue focus upon a complex issue of great importance to Hawai'i and the South Pacific: the early detection of kidney disease and the process, selection for and success of kidney transplantation. Drs. Grace and Wong address the issue of a common concomitant problem, atherosclerotic vascular disease and the disparity between "local" and mainland outcomes whereas Dr. Kataoka-Yahiro and associates show the high prevalence of risk factors for chronic kidney disease in Hawai'i with a program designed to promote early detection and intervention. Chronic kidney disease is a common co-morbidity among those with diabetes and hypertension. It is estimated that 33% of adults with diagnosed diabetes and 24% of those with undiagnosed diabetes have chronic kidney disease.¹ Similarly among adults with hypertension, 28% of those diagnosed with hypertension, 22% of undiagnosed and 17% of those with prehypertension also have chronic kidney disease.² There were an average of 45 kidney transplants each year from 2007-2011 with 377 people currently on the waiting list for organ donation.³ The clinical and public health approaches to this problem, taken together, will hopefully aid in producing the solution we all desire: better outcomes.

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Should Peripheral Vascular Disease- or Diabetes-related Amputation Contraindicate Renal Transplant?

Nalani L. Grace MD and Linda L. Wong MD

Abstract

This study investigates whether end-stage renal disease (ESRD) patients with amputation secondary to peripheral vascular disease (PVD) or diabetes mellitus (DM) are appropriate candidates for renal transplant.

Limb- or digit- amputees with ESRD on the renal transplant list from 1993-2008 were included. Comorbidities, amputation type, duration on the waitlist, and current transplant status were analyzed. Additionally, US renal transplant centers were surveyed regarding their views about amputees' transplant candidacy.

Thirty-eight ESRD patients with amputations were identified; 3 patients underwent renal transplant, 14 expired on the waitlist, and 14 were removed for medical reasons. The survey indicated that centers generally don't consider amputation a contraindication to transplant listing.

Few ESRD patients with amputations who are placed on the transplant list undergo renal transplant; most die or are removed for medical reasons. Amputation should be considered an indicator of severe PVD and possibly a relative contraindication to listing for renal transplant.

Keywords

amputation, diabetes, kidney, peripheral vascular disease, transplant

Introduction

Renal transplantation is currently the preferred treatment for most patients with end-stage renal disease (ESRD), as most transplant recipients have a higher life expectancy than patients who remain on dialysis.¹ Currently, over 80,000 patients nationally are wait-listed for kidney transplant, and 28% of kidney transplant candidates wait at least three years for a transplant.² Expedited transplantation of low-risk candidates has been advised to minimize time on dialysis, decrease post-transplant mortality,³ and improve outcomes of wait-listed patients.⁴

Having an extremity or digit amputation is often associated with end-stage severe peripheral vascular disease (PVD) and this is frequently diabetes-related. Long-term survival is poor in this population and is significantly worse among those with ESRD.⁵ Several studies⁶⁻¹⁰ have discussed the need to consider the patient's history of PVD during evaluation for transplant, but no study has explored the importance of considering a history of amputation(s) in assessing candidacy for kidney transplantation. This study reviews our center's experience with amputees with ESRD who were referred for renal transplant and their eventual outcome, and explores if such patients are appropriate candidates for renal transplant especially given the scarcity of donor kidneys. Additionally, this study investigated the opinions of US kidney transplant centers regarding the role of amputation in assessing candidacy for kidney transplantation.

Methods

This study was approved by the hospital's Institutional Review Board before the study began. This is a retrospective review of

the renal transplant program at Hawai'i Medical Center – East. At the time of this study, this center was a tertiary facility which had the only transplant center in Hawai'i. It was also the major referral center for the Pacific Rim (including Samoa, Saipan, Guam, Micronesia, and the Marshall Islands). Over 1200 kidney transplants were performed at this center between 1969 and 2011.

Subjects

The database of renal transplant candidates registered at this center was used to identify patients for this study. Of 1,098 patients evaluated and placed on the waiting list between July 23, 1993 and September 1, 2008, 38 patients were identified as having an amputation of a digit (toe or finger) or limb (upper or lower extremity) prior to or after being waitlisted for transplant.

Data Collected

Individual charts were reviewed in detail outside of the database. Data collected and analyzed included: age, gender, ethnicity (Asian, Caucasian, Pacific Islander, or "mixed" [any combination of these ethnicities]), etiology of ESRD, body mass index (BMI), diabetes mellitus (DM), hypertension, hypercholesterolemia, cerebrovascular disease, cardiac disease, smoking history, history of malignancy, current medications (anti-hypertensives, anticoagulants [aspirin, clopidogrel and warfarin], and lipid-lowering agents), and amputation history. Cerebrovascular disease was defined as a history of one or more transient ischemic attacks or cerebrovascular accidents. Patients with a documented myocardial infarction, previous coronary artery bypass, angina, or significant coronary artery stenosis as demonstrated by cardiac catheterization were classified as having a history of cardiac disease.

Information specific to the amputation included the side (left or right) and part (limb or digit) amputated, reason for amputation (gangrene, infection, or ischemia), and date of amputation. Below-knee-amputations and above-knee amputations were collectively referred to as "major" amputations. Digit (toe or finger) and transmetatarsal amputations were referred to as "minor" amputations. Amputations were further classified as affecting only one or multiple extremities.

Patient outcomes were classified into the following categories: transplanted, removed from the list, expired, active on the list as of September 1, 2008, inactivated, or voluntarily removed from the list. Patients on the waitlist were removed from the list for any of several reasons, including: noncompliance with scheduled medical appointments and dialysis treatments, substance abuse, cardiovascular co-morbidities, active or chronic infections, or malignancy. We also recorded the date of referral

for transplant, date of initiation on dialysis, date of placement on the kidney transplant waiting list, and date of outcome. Dates were used to calculate the time required for evaluation, time elapsed from the initiation of dialysis to outcome, and time elapsed from when the client was waitlisted to outcome. Cause of death, removal, or inactivation was also noted when available.

Reasons for removal from the kidney transplant waitlist between 2002 and 2008 were compared among four populations: our study population of amputees, all patients from this center, all patients in our region, and all patients nationally (per the Scientific Registry of Transplant Recipients).

Survey

Transplant coordinators and physicians of US kidney transplant centers were contacted by email. Email addresses were obtained through online registry sites and local transplant coordinators' contact lists. Coordinators/physicians were sent a link to a password-protected website that contained an 8-question survey. The username and password were provided in the email. The online survey asked general questions about transplant center policies regarding amputation status and its importance in candidacy for renal transplantation. This was a voluntary survey, and no patient information was requested or provided. The following questions were included in the survey:

1. Which kidney transplant center do you represent?
2. When assessing a renal transplant candidate's health, does your transplant center take into consideration amputation status (ie, extremity, digit, etc.)?
3. In your transplant center, is the presence of a diabetes- or PVD-related amputation considered an absolute contraindication to renal transplantation?
4. When considering a patient for renal transplantation, how important is the presence of a diabetes- or PVD-related amputation in a transplant candidate?
5. In the past five years, approximately how many amputees has your transplant center transplanted (kidney)?
6. If a patient with a limb amputation comes into your office with type II diabetes, end-stage renal disease, and PVD, would you consider the patient for: deceased donor, living transplant, neither, or both?
7. If a patient with a digit amputation comes into your office with type II diabetes, end-stage renal disease, and PVD, would you consider the patient for: deceased donor, living transplant, neither, or both?
8. In which state is your kidney transplant center located?

Statistical Analysis

Chi Square and Fisher-Exact tests were used for statistical analyses as needed (Fisher-Exact tests were used in circumstances where the sample size in any one cell was less than 10).

Results

Two hundred twenty online surveys were sent via e-mail to transplant surgeons and coordinators; 27 responses were received (response rate, 12.3%), representing 23 unique transplant centers in 14 states: Hawai'i, California, Arizona, New Mexico, Texas, Oklahoma, Louisiana, Alabama, Ohio, Michigan, Pennsylvania, North Carolina, New York, and Massachusetts. Two centers provided two survey responses and one center provided three survey responses. In cases where multiple responses were obtained from the same transplant center, the responses to each question were compared and were recorded as one response. Different answers for the same question from a single center were recorded as inconclusive.

During evaluation, 18 centers considered the patient's amputation status every time, while 5 centers considered amputation status sometimes. The presence of a PVD- or DM-associated amputation alone was never considered to be an absolute contraindication to transplant. Twelve centers considered the presence of an amputation a very important contraindication, nine centers viewed it as a moderately important contraindication, and the data from two centers were inconclusive. Approximately half of the centers (n = 12) had transplanted five or more amputees in the past five years. Twenty centers responded that they would consider a patient with a limb amputation with type II diabetes, end-stage renal disease, and PVD for live- and deceased-donor transplantation; two centers reported that they would limit these individuals to deceased-donor transplantations, and one center stated that they would not consider patients meeting these criteria for deceased- or live-donor transplantation.

Demographics of the 38 amputees placed on the renal transplant waitlist at our center are listed in Table 1. Among these patients, the primary diagnoses were DM (94.7%) and glomerulonephritis (5.3%). Comorbidities included hypertension (100%), hypercholesterolemia (81.6%), coronary artery disease (68.4%), and cerebrovascular disease (13.2%). Nineteen patients (50.0%) had a history of smoking. Three patients had a known history of cancer (one case of renal cell carcinoma, and two cases of lung malignancy). Patients took the following medications while on the transplant waiting list: anti-hypertensives (81.6%), anticoagulants/anti-platelet agents (55.3%), and lipid-lowering agents (55.3%).

Table 1. Demographics of the study population, N38	
	Study Population
Mean age	59 years
Males: Females	29:9
Mean BMI	28
Ethnicity	
Asian	34.2%
2 or more	34.2%
Pacific-Islanders	18.4%
Caucasian	10.5%
Other	2.6%

Fifty-four amputations occurred in the 38 patients. Types of amputations included: minor, digits only (36); and major, below the knee (13) and above the knee (5). Among the 38 patients, 24 patients had one amputation, and 14 patients had multiple (two to four) amputations. Fourteen patients had a major amputation, and 24 patients had a minor amputation. Twenty-five patients had amputations involving one extremity, while 13 patients had amputations involving multiple extremities. Reasons for amputation, where available, included: gangrene (19), diabetes (6), osteomyelitis (4), infection (3), and PVD (2).

Of 38 amputees, only three (7.9%) eventually underwent renal transplant. The remaining 35 patients did not undergo renal transplant: 14 were removed for medical reasons. The reasons for removal, where available, included diabetes (2), "too sick for transplant" (3), additional amputation (1), infection (1), and GI bleed (1). Fourteen patients expired on the waitlist. The causes of death, where available, included cardiac arrest (6), cardiac/respiratory failures (3), infections (2), sepsis(1). Two were inactivated for noncompliance with medical appointments, 1 refused transplantation, and 4 were active as of data collection end date 9/1/08. Of the 3 patients who underwent renal transplant, 1 received a living donor transplant 50 days from listing and the other 2 received a deceased donor transplant at 1375 and 1542 days after listing. At the time of data collection, two of the three transplanted amputees were still living and one had died from pneumonia five years post-transplant. The recipient who had died had received a deceased donor renal transplant.

Patients spent a mean of 313 days (range: 29 to 1282) for the evaluation process, and remained a mean of 1221 days (range: 50 to 3553) on the list before transplant, removal, inactivation, or death. Mean time on dialysis was 402 days (range: 2 to 1454) prior to referral for transplant evaluation.

All patients with above the knee amputations (AKA) were removed from the waitlist. Of patients with below the knee amputations (BKA), 46.2% were removed, 30.8% expired on

the waitlist, 7.7% were transplanted, 7.7% are active, and 7.7% are inactive. Of patients with digits amputated, 38.9% were removed, 36.1% expired on the waitlist, 8.3% were transplanted, 5.6% are inactive, and 2.8% quit.

Outcome of those with major vs minor amputation are shown in Table 2. Outcome of those with amputations involving one vs multiple extremities is shown in Table 3. Comparison of reasons for removal of patients from the transplant waitlist among our study population, all patients from this center, all patients from our region, and all patients nationally between 2002 and 2008 is shown in Table 4.

Statistical analyses of these data are shown in Table 5. These data demonstrate that compared with our center's population, our study group is less likely to be transplanted ($P < .001$), more likely to die while awaiting a transplant ($P < .005$), and more likely to be removed from the waitlist due to being medically unfit for transplant ($P < .001$). Additionally, these data demonstrate that compared with the regional kidney transplant waitlist population, our center's population is more likely to be removed from the waitlist due to being medically unfit for transplant ($P < .001$), more likely to expire while awaiting a transplant ($P < .05$), less likely to be transplanted ($P < .001$), and more likely to refuse transplantation ($P < .001$). Compared with the national kidney transplant waitlist population, our center's population is more likely to be removed from the waitlist due to being medically unfit for transplant ($P < .001$), less likely to be transplanted ($P < .005$), and more likely to refuse transplantation ($P < .001$).

Discussion

Renal transplant is cost-effective, provides superior long-term survival, and improves quality of life years compared to dialysis.^{11,12} Absolute contraindications to renal transplant include active infection or gangrene, malignancy, substance abuse, poor cardiac function, and non-adherence to therapy.^{13,14} In the absence of absolute contraindications, patients should undergo

	Transplanted	Removed	Expired	Active	Inactive	Quit	Total
Major (% of category / Total # Major Amputations)	1 (7.1%)	8 (57.1%)	3 (21.4%)	1 (7.1%)	1 (7.1%)	0 (0%)	14 (100%)
Minor (% of category / Total # Minor Amputations)	2 (8.3%)	7 (29.2%)	10 (41.7%)	3 (12.5%)	1 (4.2%)	1 (4.2%)	24 (100%)

	Transplanted	Removed	Expired	Active	Inactive	Quit	Total
1 extremity involved (% of category / total # 1-extremity amputations)	1 (4.0%)	9 (36.0%)	8 (32.0%)	4 (16.0%)	2 (8.0%)	1 (4.0%)	25 (100%)
>1 extremity involved (% of category / total # multiple-extremity amputations)	2 (15.4%)	6 (46.2%)	5 (38.5%)	0 (0%)	0 (0%)	0 (0%)	13 (100%)

Table 4. All renal transplant candidates, removed from the transplant waiting list between 2002-2008				
	Study population (%; N = 34)	HMC* (%; N = 723)	Region* (%; N = 4,665)	National* (%; N = 180,502)
Med unfit/too sick	41.2%	9.8%	4.7%	4.5%
Expired	41.2%	15.6%	12.4%	17.1%
Transplanted	8.8%	51.2%	70.5%	56.9%
Refused transplant	2.9%	5.3%	1.5%	1.0%
Condition improved	0.0%	0.3%	0.2%	0.4%
Other	5.9%	17.8%	10.8%	20.1%
	100.0%	100.0%	100.0%	100.0%

HMC: Hawai'i Medical Center. *Data from the Scientific Registry of Transplant Recipients.²⁵

Table 5. Statistical analyses of data from Table 4. NS = not statistically significant, or $P > .05$.									
	Study Population vs. HMC (All)			HMC (All) vs. Regional		HMC (All) vs. National		Regional vs. National	
	Chi-square	P	Fisher-Exact (P)	Chi-square	P	Chi-square	P	Chi-square	P
Med unfit/too sick	28.9627	<.001	<.001	32.0377	<.001	46.9894	<.001	0.3338	ns, $P > .05$
Expired	13.4048	<.005	<.005	5.5886	<.05	1.0410	ns, $P > .05$	72.0650	<.001
Transplanted	21.6400	<.001	<.001	105.8863	<.001	9.2220	<.005	343.5277	<.001
Refused transplant	0.0339	ns, $P > .05$	ns, $P > .05$	44.8757	<.001	122.1232	<.001	8.1921	<.005
Condition improved	1.9662	ns, $P > .05$	ns, $P > .05$	0.0397	ns, $P > .05$	0.0676	ns, $P > .05$	2.9322	ns, $P > .05$
Other	2.4639	ns, $P > .05$	ns, $P > .05$	29.2352	<.001	2.2025	ns, $P > .05$	247.5468	<.001

evaluation and if appropriate, be waitlisted and transplanted as organs become available.

Transplant opportunities are limited by the chronic shortage of kidneys¹⁵ and the cost and staff workload involved in waitlist maintenance.¹⁶ The ongoing scarcity of kidneys challenges transplant centers to increase organ supply (by living donation, pairing of kidneys, and using extended-criteria donors¹⁷), and to carefully adjust organ allocation schemes to balance utility and equity.¹⁸ Studies have emphasized the importance of improving organ donation efficiency to save lives,¹⁹ and maximizing life years to benefit patients and society.^{20,21} Persad, et al, emphasize a fair organ allocation framework that maximizes benefits gained from transplant and considers patients' prognosis.²² Norman, et al, suggested that a potential solution to ongoing organ shortage is considering patients with multiple diseases such as PVD unsuitable for transplant.²³ This article asks, "are amputees unsuitable for transplant?"

In non-transplanted patients, the extent of amputation has been associated with mortality. Aulivola, et al, in a study of 959 amputees found that overall one- and five-year survival was 69.7% and 34.7%, respectively. However, in a subset of amputees with ESRD, the one- and five-year survival was 51.9% and 14.4% respectively, which were significantly worse than the corresponding proportions among non-ESRD amputees (75.4% and 42.2%, respectively). Eggers, et al, showed that the two-year survival of ESRD patients with a toe amputation is 44.8%, compared with 31.7% for patients with a BKA, and 15.2% for patients with AKA.²⁴ These data suggest that ESRD

significantly worsens amputees' prognosis, and that amputees with ESRD have limited long-term survival.

Our study demonstrates that only a small percentage of amputees on the waitlist eventually receive a transplant. The comparison of our study population compared with the populations of our center, our region, and nationally demonstrates several important points. Hawai'i's transplant population is less likely to be transplanted compared with the national population; this may be related to our state's scarcity of kidneys and longer waiting times. The Scientific Registry for Transplant Recipients data shows our center's median time to transplant is >72 months, compared with 50 months nationally.²⁵ Longer waiting times on Hawai'i's transplant waitlist may result in a higher percentage of people becoming medically unfit while awaiting transplant, and perhaps as a result, more people ultimately refuse transplantation because of how far their illness has progressed. Comparing our study population to our center's population demonstrates an amplified disadvantage among amputees at our center for receiving a transplant. This disparity may be secondary to the advanced stage of vascular disease in the amputee population, which in turn may increase the likelihood for removal from the waitlist for being medically unfit.

Does transplant alter the progression of PVD in amputees, thereby improving long-term survival? Gill, et al, suggest that progression of comorbidities may be different among transplanted and non-transplanted persons, thereby impacting the survival benefit associated with transplant.²⁶ While Meier-Kriesche, et al, have demonstrated that renal transplant

significantly decreases cardiovascular mortality, studies on amputees post-transplant are lacking. Further research comparing the life expectancy of amputees after transplant with that of non-transplanted amputees will be important in assessing the advantages of listing and transplanting these patients.

Online survey responses suggest that amputation status is an important factor in overall assessment of a patient's health, and most centers have transplanted a small number of amputees, although we did not inquire about the number of amputees on the transplant waitlists at these transplant centers. At this time, no formal guidelines on how a history of amputation should influence candidacy for transplantation are in use. Centers that we surveyed still consider amputees for possible transplant. Although our study is somewhat limited by the small sample size, it represents all of Hawai'i's amputee transplant candidates within the past 15 years and we have tracked the course of individual patients from referral for transplant to death, removal from the list, or transplant. Larger studies with multiple centers will be necessary to understand the extent to which amputees are a high-risk sub-group among waitlisted patients, and to create evidenced-based guidelines that address the importance of considering a history of amputation in renal transplantation. Specifically, while developing guidelines for this population, the following factors may be considered: the possibility of expedited transplant before progression of comorbidities, frequent re-evaluation for progression of disease while on the list, and perhaps better counseling of patients that discourages pursuit of transplantation, or better preparation for the unlikelihood of obtaining a transplant given the high risk of disease progression and death in this population.

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Conflict of Interest

None of the authors identify any conflict of interest.

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Evaluation of the National Kidney Foundation of Hawai'i's Kidney Early Detection Screening Program

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Abstract

Purpose: Discussion of the formative program evaluation results of the National Kidney Foundation of Hawai'i (NKFH) Kidney Early Detection Screening (KEDS) program for Chronic Kidney Disease (CKD). The formative program evaluation had 921 participants who enrolled in the NKFH KEDS screening program between 2006-2009. The evaluation included 14 KEDS sites in Honolulu, Maui, and Hawai'i counties.

Main Findings: Based on the results of the formative evaluation, process changes were made to program recruitment, training, and procedure. A majority of participants were women, between 46 and 75 years old. The ethnic groups represented were: White, Japanese, Hawaiian/Part Hawaiian, Filipino, Chinese, Hispanic, and Other. The three most common risk factors identified were: (1) blood relative with diabetes, (2) blood relative with cardiovascular disease, and (3) self-reported high blood pressure. Participants in Hawai'i County had the highest mean for total risk factors. Ethnicity, gender, and age were significantly associated with selected vital signs, physiological measures, and lab tests. Fourteen percent of KEDS participants had an abnormal albumin:creatinine (A:C) ratio and 12% had an abnormal glomerular filtration rate (GFR), requiring follow-up by a health care professional.

Principal Conclusions: The KEDS formative program evaluation findings improved program planning and implementation. Summative program evaluation and implications for conducting research studies in this area will be the next step in the evaluation process.

Keywords

Health Screening Program, Health Promotion, Disease Prevention, Program Evaluation, Chronic Kidney Disease

Introduction

Chronic Kidney Disease (CKD) is one of the ten leading causes of death in the United States.¹ According to the most recent national estimates by the Centers for Disease Control and Prevention (CDC), 16.8% of US adults aged 20 and older had CKD between 1999-2004.² While comprehensive state-level data exists on End Stage Renal Disease and treatment, no state-specific data are available on CKD and its early stages. Applying national estimates of CKD prevalence to the population in Hawai'i, an estimated 156,000 local adults aged 20 and older may have CKD and another 100,000 are at-risk.^{2,3}

CKD is a debilitating disease and a majority of patients die before being placed on long-term dialysis or receiving a kidney transplant.⁴ Dialysis treatments average four to five hours per visit, three times per week. The cost of care for dialysis patients ranges from \$60,000 - \$80,000 per person per year.⁵ Using an average of \$70,000, the estimated cost of treatment for Hawai'i's 2,700 dialysis patients exceeds \$180 million a year.⁵

Hawai'i's kidney failure rate is 30% higher than the national level.⁶ A large proportion (88%) of our kidney patients on dialysis are of Asian and/or Pacific Island (API) ancestry with

major ethnic groups being Japanese (26.7%), Filipino (24.7%), and Native Hawaiian (17%).⁶ The percentage breakdown of the State of Hawai'i population based on Japanese, Filipino, and Native Hawaiian was 13.6%, 14.5%, and 5.9%, respectively.⁷ In 2005, the National Kidney Foundation of Hawai'i (NKFH) developed the Kidney Early Detection Screening (KEDS) program to raise awareness about individual risk for kidney disease and stimulate early screening of risk factors among people in Hawai'i. KEDS is a free-standing health screening which was adapted from a national program called Kidney Early Evaluation Program (KEEP).

Hawaiian values of collaboration (laulima), inclusiveness (kakou), and responsibility (kuleana) were emphasized in the development and operation of KEDS.⁸ Key informants from community health centers, state hospitals, and other community agencies helped guide decisions on how to recruit participants and partner with local organizations. Community outreach workers served as participant recruiters, having already established a rapport with many of the area residents. Community-based businesses offered support in the form of manpower, facilities, advertisement, and donated supplies. Finally, health care professionals (ie, physicians, nurses, medical technicians, pharmacists, dietitians, and community health workers) volunteered their time to make the screening culturally sensitive and "welcoming" for the local community.

The purpose of this article is to describe the formative program evaluation results of the Kidney Early Detection Screening (KEDS) program for CKD conducted in Hawai'i from 2006 to 2009. The article will specifically address KEDS program objectives: (a) utilize a grassroots, community-based approach when collaborating with partners to implement the program and (b) collect data and observe trends in CKD prevalence and risk in selected communities.

Methods

Design

This is a formative program evaluation of the NKFH KEDS program. The program evaluation was approved by the University of Hawai'i at Manoa Committee on Human Studies.

Participants

The participants, regardless of health insurance or health condition, ethnicity, or gender, were encouraged to participate in KEDS without a fee. This "open door policy eliminated barriers to participation, and provided the NKFH with an opportunity to cast a "wider net" by reaching those at possible risk for CKD. The

eligibility criteria for the evaluation included: (1) enrollment in a KEDS screening program between 2006-2009, (2) 18 years and older, and (3) residents of the State of Hawai'i. Based on this enrollment eligibility criteria, 921 of the 1014 participants (90.8%) were included in this formative program evaluation. A total of 93 participants (9%) were excluded because they did not meet the enrollment eligibility criteria.

Settings

Of the fourteen KEDS events, six were held in Honolulu County, six in Maui County, and two in Hawai'i County. Five events were held in urban (metropolitan) O'ahu and the other nine were held in rural (non-metropolitan) areas of the State (ie, Hilo, Kahului, Hana).⁹ The KEDS sites ranged from shopping malls, community colleges, community health centers, hospitals, community centers, and the Hawai'i State Capitol. Venues were chosen collaboratively with community partners and on several criteria such as adequate space, availability, affordability, convenience, and accessibility to the public. Other logistical requirements were the presence of electrical outlets, adequate number of bathrooms, moderate room temperature and/or air conditioning, and tables and chairs.

Data Collection Forms

KEDS program evaluations after each event were used to collect information on recruitment of participants, training of volunteers, and program procedures. Participant demographic information including gender, age, ethnicity, zipcode, and individual/total risk factors were obtained for purposes of marketing and planning future programs. Clinical risk factors included a medical history of diabetes, hypertension, or hypercholesterolemia; a family history of diabetes, cardiovascular disease, or kidney disease; or a social history of cigarette smoking. Anthropometric measurements of blood pressure (BP), height, weight, body mass index (BMI), and lab values (ie, glomerular filtration rate (GFR), fasting and non-fasting glucose levels, total cholesterol, urine microalbuminuria, and albumin to creatinine ratio [A:C ratio]) were obtained.

The two assessment forms utilized in the KEDS program evaluation were the NKFH KEDS Participant Form and the Hilo Medical Center Assessment Form. Five content experts from the NKFH and the University of Hawai'i School of Nursing and Dental Hygiene at Manoa completed a content analysis to compare both forms. After careful review, they concluded that although there were slight differences in the wording of questions, the two forms were similar in content. Process improvements for future evaluations will need to include standardization of screening forms (ie, rewording of risk factor questions, use of categories similar to national surveys, questions eliciting information about participant use of medications, revising ethnicity categories to include additional ethnic groups).

Data Analysis

Descriptive statistics were used to characterize the participants who came to the KEDS program and to detect trends in CKD prevalence. Data was collected on participants' demographic characteristics, risk factors (total and individual), vital signs, physiological measures, and lab values (blood and urinalysis) (see Tables 1, 2, and 3). Pearson's chi-square tests were performed on demographic characteristics (gender, ethnicity, and age) with BMI, total cholesterol, microalbuminuria, A:C ratio, GFR, systolic and diastolic BP readings, and glucose (fasting and non-fasting). The significant *P*-value cutoff was 0.5. Ethnicity included seven major ethnic categories: Hawaiian/Part Hawaiian, Japanese, Chinese, Filipino, White, Hispanic, and Other.¹⁰ Age categories included 18-30, 31-45, 46-60, 61-75, and 75 years or greater.¹¹ BMI, total cholesterol, systolic and diastolic BP, non-fasting and fasting glucose were re-coded to provide sufficient numbers in each category and easier interpretation.¹²⁻¹⁷ Data was entered into an Excel file and transferred to SPSS-PC Version 18 for analysis.

Results

Recruitment of Participants and Lessons Learned

A standard protocol consisting of fliers and radio/newspaper ads were utilized. Word of mouth, "snowball effect," and use of key informants proved effective in smaller communities (such as Hana, Maui).¹⁸ For screenings held in larger communities on O'ahu (Honolulu County), interested participants could walk-in or pre-register by phone. A lesson learned was that a "one-size-fits-all" approach does not work when marketing the program to different communities. It was best to consult with key informants in the community. Strategic placement of banners, T-shirt giveaways, and other grassroots tactics were successful in smaller rural communities, whereas radio, newspaper, or television ads worked best in larger urban areas such as Honolulu. Attempting to utilize radio or newspaper ads in smaller, rural communities was not as successful.

Training of Volunteers and Lessons Learned

Approximately 25 to 45 volunteers were present at each event. Volunteers consisted of students in the health professions, health care professionals, and lay individuals. A standardized orientation was conducted prior to each event and included: (a) screening purpose and program procedures, (b) paperwork and documentation, (c) interviewing techniques, (d) equipment protocols for blood testing, (e) physical measurements, (f) urinalysis, and (g) screening follow-up recommendations. KEDS events relied solely on trained volunteers. While some community volunteers participated regularly, a majority of volunteers at each event were new. Not only was training time consuming, but standardizing the training procedure was difficult. As a result, a series of short training segments was created on YouTube (<http://www.youtube.com/kedsorientation>) so that new volunteers could access the standardized training at their convenience.

Program Procedure and Lessons Learned

A typical KEDS event consisted of five stations, in the following order: Station One, Registration; Station Two, Physical Measurements; Station Three, Urinalysis; Station Four, Blood Draw; and Station Five, Exit Interview (Clinician Consultation).

Station One-Registration: Participants signed in and completed the assessment form. Community volunteers were on hand to assist individuals with visual impairments or language barriers.

Station Two-Physical Measurements: Student or professional volunteers performed BP readings and height and weight measurements. For most events held in Honolulu County, volunteers used a Welch-Allyn Spot Vital Signs (420 Series) BP monitor and a Tanita BWB-800 digital weight scale. BP cuffs were fitted for proper arm size and clothing was removed on the left or right upper arm of participants.

Station Three-Urinalysis: Volunteers provided participants with a specimen cup and instructions on how to provide a “clean-catch” urine sample. Specimens were processed utilizing either a Clinitek 50 or Clinitek Status Analyzer. Bayer/ Siemens Diagnostics Microalbumin Reagent test strips were utilized.

Station Four-Blood Draw: Venous or capillary blood specimens were collected by professionals skilled in phlebotomy. Venous blood draw specimens were transported via couriers to local laboratories for processing. For capillary blood specimens, Accu-Check Aviva blood glucose meters and test strips by Roche were used.

Station Five-Exit Interview: Clinicians conducted brief (approximately 5-10 minute) interviews with participants and reviewed screening results. General recommendations and education regarding risk factors for CKD were also provided. Participants with concerns or abnormal results were advised to follow-up with their primary care providers. Venous blood specimen results were mailed to the participants’ homes seven to ten days after the screening.

It was discovered that certain process functions could be monitored to increase the success of KEDS. Arranging stations from least invasive to most invasive maximized comfort and cooperation from participants, allowing for improved accuracy of measurements and quality of participant/clinician experience. Secondly, when participants turn-out was high (75 or more participants), it was not advisable to allow participants to “skip stations” or “fall out of order.” Many participants would request to proceed to the next station rather than wait, however, doing so impeded the coordinator’s ability to keep participants moving through the stations in an organized manner. If the screening turn out was less than 60 to 70 people, allowing participants to proceed out of order through the stations was manageable with an experienced coordinator. Lastly, it was not recommended that community screenings accommodate more than 150 individuals per day. Screening beyond 150 people in one day diminished

the quality of the screening as volunteers became fatigued and the likelihood of errors increased.

Table 1. Characteristics of NKFH KEDS Participants and Risk Factors (N=921)		
Variable	Mean (SD)	Sample Size
Gender		n=900
Male		337 (37.4%)
Female		563 (62.6%)
Missing = 21 ^a		
Age	55 (16.7)	n=847
18-30		69 (8.1%)
31-45		173 (20.4%)
46-60		271 (32.0%)
61-75		223 (26.3%)
75+		111 (13.1%)
Missing = 74 ^a		
Ethnicity		n=808
Hawaiian/Part Hawaiian		168 (20.8%)
Filipino		141 (17.5%)
Japanese		182 (22.5%)
Chinese		56 (6.9%)
White		197 (24.4%)
Hispanic		14 (1.7%)
Other ^b		50 (6.2%)
Missing = 113 ^a		
RISK FACTORS		
Total Risk (cumulative count of individual risk factors)	1.79 (1.6)	N=921
0		236 (25.6%)
1		223 (24.2%)
2		187 (20.3%)
3		129 (14.0%)
4		84 (9.1%)
5		44 (4.8%)
6		17 (1.8%)
7		1 (.1%)
Individual Risk Factors^c		n=1650
Blood Relative with Diabetes		413 (44.8%)
Blood Relative with Cardiovascular Disease		273 (29.6%)
Blood Relative with Kidney Disease		107 (11.6%)
High Blood Pressure		360 (39.1%)
Diabetes		185 (20.1%)
High Cholesterol		265 (28.8%)
Smoking Behaviors ^d		47 (5.1%)

^aMissing data are due to participants leaving a blank response.

^bincludes non-Hawaiian mixed, African-American, and American Indian

^cparticipants could check off more than one

^dOf the N=921, 288 participants were not assessed for risk of smoking behaviors prior to September 2007. (47/633=7.4%)

Table 2. Vital Sign and Physiological Measures (N=921)		
Variable	Mean (SD)	Sample Size
VITAL SIGN MEASURES		
Systolic Blood Pressure¹⁶⁻¹⁷	127.23 (17.8)	n=899
<119 mmHg Normal		
120-139 mmHg Pre-hypertension		310 (34.5%)
140-159 mmHg Stage 1 hypertension		410 (45.6%)
160> mmHg Stage 2 hypertension		133 (14.8%)
Missing =22 ^a		46 (5.1%)
Diastolic Blood Pressure²¹⁻²²	76.2 (10.1)	n=899
<79 mmHg Normal		
80-89 mmHg Pre-hypertension		572 (63.6%)
90-99 mmHg Stage 1 hypertension		246 (27.4%)
>100 mmHg Stage 2 hypertension		65 (7.2%)
Missing=22 ^a		16 (1.8%)
PHYSIOLOGICAL MEASURES		
Height	64.54 (4.1)	n=900
48-61 inches		202 (22.4%)
62-66 inches		432 (48.0%)
67-71 inches		217 (24.1%)
72-76 inches		49 (5.4%)
Missing=21 ^a		
Weight	162.76 (46.0)	n=900
0-124 lbs		171 (19.0%)
125-168 lbs		401 (44.6%)
169-202 lbs		176 (19.6%)
>203 lbs		152 (16.9%)
Missing=21 ^a		
Body Mass Index (BMI)¹²	27.27 (6.5)	n=899
<18.5 (Underweight)		25 (2.8%)
18.6-24.9 (Normal)		314 (34.9%)
25.0-29.9 (Overweight)		316 (35.2%)
>30.0 (Obese to Extreme Obesity)		244 (27.1%)
Missing=22 ^a		

^aMissing data are due to participants leaving a blank response.

Table 3. Lab Values (N=921)		
BLOOD	Mean (SD)	Sample Size
Glomerular Filtration Rate (GFR) ml/min¹³⁻¹⁵	58.40 (7.0)	n=104
Less than 60 ml/min (Abnormal)		12 (11.5%)
60 or greater ml/min (Normal)		92 (88.5%)
Missing = 817 ^a		
Glucose		
Non-fasting¹⁴	115.86 (46.4)	n=671
0-59 mg/dl (Low)		4 (.6%)
60-139 mg/dl (Normal)		574 (85.5%)
140-199 mg/dl (High)		60 (8.9%)
>200 mg/dl (Urgent)		33 (4.9%)
Missing = 121 ^a		
Fasting¹⁴		n=129
0-59 mg/dl - Low		0
60-126 mg/dl -Normal		120 (93.0%)
127-199 mg/dl - High		8 (6.2%)
>200 mg/dl – Urgent		1 (.8%)
Missing = 0 ^a		
Total Cholesterol¹³	181.73 (36.4)	n=201
0-199 mg/dl (Normal)		141 (70.1%)
>200 (Abnormal)		60 (29.8%)
Missing = 720 ^a		
URINALYSIS		
Microalbuminuria¹⁴		n=869
Less than 30 mg/L (Normal)		426 (49.0%)
Greater than 30mg/L (Abnormal)		443 (51.0%)
Missing = 52 ^a		
Albumin-to-Creatinine A:C Ratio¹⁴		n=870
Less than 30 mg/gm - Normal		749 (86.1%)
Greater than 30 mg/gm – Abnormal		121 (13.9%)
Missing = 51 ^a		

^aMissing data are due to participants leaving a blank response.

Table 4. Comparison of KEDS and KEEP		
Variables	KEDS 2006-2009 data N = 921	KEEP 2000-2008 data (KEEP 2009 report) N=107,309
Gender		
Male	337 (37.4%)	34,190 (31.9%)
Female	563 (62.6%)	73,049 (68.1%)
Age		
18-30	69 (8.1%)	8,015 (7.5%)
31-45	173 (20.4%)	22,344 (20.8%)
46-60	271 (32.0%)	37,512 (35.0%)
61-75	223 (24.2%)	29,650 (27.6%)
75+	111 (12.1%)	9,788 (9.1%)
Ethnicity		
Hawaiian/Part-Hawaiian	168 (20.8%)	Other ^a
Filipino	141 (17.5%)	Other ^a
Japanese	182 (22.5%)	Other ^v
Chinese	56 (6.9%)	Other ^a
Mixed Non-Hawaiian	42 (4.6%)	Other ^a
White	197 (24.4%)	50,908 (47.4%)
African-American	4 (.4%)	35,022 (32.6%)
Native American	4 (.4%)	4,059 (3.8%)
Hispanic	14 (1.7%)	Other=14,425 (13.5%)
Observed Albumin-to-Creatinine (A:C) Ratio >30 mg/gm	121 (13.9%)	11,342 (11.7%)

^aKEEP specified only White, African-American, and Native American. Other ethnicities were grouped as "Other." (KEEP 2009 Report)

Description of the Participants Who Attended KEDS Between 2006 - 2009 (see Table 1)

A majority of participants were women (62.6%), 46.7% resided in Maui, 41.6% in Honolulu, and 11.5% in Hawai'i counties. The mean (SD) age = 55 (16.7) years. Over 50% of the participants were between the ages of 46-75 years of age. By ethnicity, participants represented in this evaluation were White (24.4%), Japanese (22.5%), Hawaiian/Part Hawaiian (20.8%), and Filipino (17.5%). The mean (SD) of self-reported total risk factors = 1.79 (1.6). Individual risk factors included (a) blood relative with diabetes (44.8%), (b) blood relative with cardiovascular disease (29.6%), (c) blood relative with kidney disease (11.6%), (d) high blood pressure (39.1%), (e) diabetes (20.1%), (f) high cholesterol (28.8%), and (g) smoking behavior (5.1%). Hawai'i County participants had the highest mean for total risk factors (Mean = 2.32) compared to Honolulu County (Mean = 1.67), and Maui County (Mean = 1.77).

Descriptive Analyses of Vital Signs, Physiological Measures, and Lab Values (see Table 2 and 3)

Forty-six percent of participants had systolic BP readings in the pre-hypertensive range (120-139 mmHg), 14.8% had Stage 1 hypertension (140-159 mmHg), and 5.1% had Stage 2 hyperten-

sion (greater than or equal to 160 mm Hg). Thirty-six percent of the participants had diastolic BP readings of 80-89 mmHg or greater. The mean (SD) height = 64.5 (4.1) inches, and the mean (SD) weight = 162.8 (46) pounds. Sixty-two percent of the participants had a BMI of 25.0 or greater, indicating overweight or obesity. Fourteen percent of the sample had a non-fasting glucose of 140 mg/dl or greater and 7% had a fasting glucose above 127 mg/dl or greater; both these results are indicative of abnormal blood glucose levels. Fifty-one percent had an abnormal result for microalbuminuria, (greater than 30 mg/L) and 14% had an abnormal A:C ratio (greater than 30 mg/gm), potential markers for CKD.¹⁹ GFR and total cholesterol readings were obtained for a subset of participants, n = 104 and n = 201, respectively. Among those measured, 12% had an abnormal GFR of less than 60 ml/min, another potential marker for CKD.¹⁹ The mean (SD) total cholesterol level = 181.7 (36.4). Seventy percent had normal total cholesterol readings of less than 200 and 30% had abnormal total cholesterol readings greater than 200. The overall A:C ratio results for KEDS (13.9%) were similar with KEEP (11.7%) (see Table 4).

Crosstabulations were done on ethnicity, gender, and age with systolic and diastolic BP readings, glucose (fasting and non-fasting), BMI, total cholesterol, GFR, microalbuminuria, and A:C ratio. Ethnicity was significantly associated with BMI ($P < .001$). Gender was significantly associated with BMI ($P < .001$), systolic ($P < .001$) and diastolic BPs ($P = .002$), and total cholesterol ($P = .030$). Age was significantly associated with BMI ($P = .001$), systolic ($P < .001$) and diastolic BP ($P < .001$), glucose (non-fasting) levels ($P = .003$), and GFR ($P < .001$). Increase in BP, glucose (non-fasting), BMI levels, and abnormal GFR percentages were noted with an increase in age, particularly for participants 31 to 75 years of age.

Discussion

This is a formative program evaluation of the NKFH KEDS program of 921 participants who enrolled between 2006-2009. Three counties were included: Honolulu, Maui, and Hawai'i. Process changes were made based on lessons learned. Example of process changes were (a) different marketing approaches were targeted for urban versus rural areas of the State, (b) creation of a YouTube standardized video for training, (c) organization of KEDs stations from least to most invasive and maintaining each screening to less than 150, and (d) standardization of assessment forms.

The majority of participants were between the ages of 46 and 75 years of age, and were primarily women. The ethnic groups most represented were White, Japanese, Chinese, Filipino, and Hawaiian/Part Hawaiian. Participants had an average of one or two risk factors out of seven total risk factors. The three most identified individual risk factors included; (1) blood relative with diabetes, (2) blood relative with cardiovascular disease, and (3) self-reported high BP. Hawai'i County participants had the highest mean for total risk factors. Ethnicity was significantly associated with BMI and Hawaiian/Part Hawaiian ethnicity had a higher percentage of BMI than other ethnicities. It is noted

that Native Hawaiians have the highest mean BMI for men and women in comparison to different ethnic groups in Hawai'i, increasing the risk factors for other co-morbidities.²⁰⁻²² Gender was significantly associated with BMI, systolic and diastolic BPs, and total cholesterol. A higher percentage of women had higher cholesterol levels when compared with men.²³ In contrast, a higher percentage of men had higher BMI levels and systolic and diastolic BP levels than women. The results were consistent with similar studies in the literature.^{21,24-26} Age was significantly associated with BMI, systolic and diastolic BPs, glucose (non-fasting), and GFR, particularly, among participants 31 to 75 years of age. There was also an inverse relationship between GFR and age. For older participants, there was a natural degree of expected decline in GFR.²⁷ Hypertension, diabetes, obesity, and CKD are associated with increased risk factors in adults during mid-life, and results are congruent with studies in the literature.²⁸⁻³²

A comparison with KEDS and Kidney Early Evaluation Program (KEEP) data on selected variables was done.³³ The two programs had similar proportions of men to women and age distributions. KEDS differentiated between the various API subgroups such as Japanese, Chinese, Filipino, and Hawaiian/Part Hawaiian, whereas KEEP aggregated all APIs in the "other" category. The unique contribution of KEDS was the use of disaggregated API data not found in KEEP. Also while overall A:C ratio results were similar with KEEP, the percentage of abnormal results were higher for KEDS.

Recommendations

The formative program evaluation addressed KEDS program objectives in assessing for efficient use of a grassroots, community-based approach and collecting data and observing trends in CKD prevalence and risk in selected communities. Limitations of the formative program evaluation were related to large numbers of missing data on selected information collected and lack of standardization of assessment forms. Standardizing the data collection forms and procedure, should decrease the extent of missing data and improve the validity and reliability of the data collected for the program. The next step will be to address the summative program evaluation of the KEDS program by examining whether the program facilitated early detection of CKD in a diverse group of people in the State of

Hawai'i and whether the program was effective in providing early education and awareness to the general public about the importance of early CKD detection.

Primary objectives in formative program evaluation were to assure program plans and procedures were efficient and address the composition of the target population who participated.³⁴ The program incorporated culturally sensitive values of collaboration, worked closely with key informants in the community, and partnered with community-based businesses and health care professionals throughout the state. Over a period of three years, the KEDS program was able to reach over 1000 individuals through 14 events held throughout the state. Future program summative evaluation plans may include use of pre-post testing of process and outcome measures to determine whether the KEDS program was able to facilitate early detection of CKD and provide early education and awareness to the general public about the importance of early CKD detection.

Ethical Approval

The study was approved by the University of Hawai'i at Manoa, Committee on Human Studies.

Disclosure Statement

None of the authors identify any conflict of interest.

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Takotsubo Cardiomyopathy in the Setting of Acute Alcohol Withdrawal

Brian J. Stout MD; Reid Hoshida BS; and Dale S. Vincent MD

Abstract

Takotsubo Cardiomyopathy (TCM), also known as stress-induced cardiomyopathy, is a cardiomyopathy characterized by acute reversible apical ventricular dysfunction and apical akinesis in the absence of obstructive coronary artery disease. Although the disease may be precipitated by an acute emotional or physical stressor, the pathophysiology, postulated to involve excess catecholamine release, remains unproven. In contrast, the role of catecholamine excess and hyperadrenergic physiology in acute alcohol withdrawal (AAW) is more established. TCM in the context of acute alcohol withdrawal has been only rarely described. The authors present a new case of TCM in the setting of AAW, along with a review of other reported cases. Current theories on the etiology of TCM and a possible pathophysiologic linkage between TCM and AAW are discussed.

Keywords

Takotsubo Cardiomyopathy; Alcohol Withdrawal; Stress-induced Cardiomyopathy; Stress Cardiomyopathy; Cardiac Complications of Alcohol Withdrawal

Introduction

Takotsubo Cardiomyopathy (TCM), also known as stress-induced cardiomyopathy, is a cardiomyopathy characterized by acute reversible apical ventricular dysfunction and apical akinesis in the absence of obstructive coronary artery disease. Although the disease may be precipitated by an acute emotional or physical stressor, the pathophysiology, postulated to involve excess catecholamine release, remains unproven. In contrast, the role of catecholamine excess and hyperadrenergic physiology in acute alcohol withdrawal (AAW) is more established.

“Takotsubo” means “octopus trap” in Japanese, a jar-shaped device with a similar appearance to the apical akinetic heart of TCM. Also known as apical ballooning syndrome, broken heart syndrome, and stress or stress-induced cardiomyopathy, TCM is recognized clinically by presenting signs and symptoms (chest pain, dyspnea, and occasional syncope, as well as abnormal EKG findings with elevated cardiac biochemical markers) that often mimic Acute Coronary Syndrome. Diagnosis is essentially one of exclusion, often following cardiac catheterization that reveals normal or nonobstructive coronary artery disease. Left ventricular dysfunction is common, demonstrated with echocardiogram or left ventriculogram. Common findings are depressed ejection fraction and left ventricular apical akinesis. Treatment for TCM is supportive, as there appears to be no definitive benefit to pharmacologic therapy, to include beta-blockade, calcium channel blockade, ace inhibitor, or aspirin therapy.¹ The long term prognosis in individuals with this condition is generally very good, with many patients experiencing full resolution of systolic dysfunction in 4-8 weeks. Complications are rare, and include heart failure, free-wall rupture, fatal ventricular arrhythmias, and mural thrombus formation.

Multiple etiologies for TCM have been proposed, and catecholamine toxicity is increasingly accepted as the likely explanation. Excessive adrenergic stimulus is known to cause a cardiotoxic

effect in other conditions involving excessive catecholamine release. One example is myocardial damage as a result of hypertensive crisis in the setting of pheochromocytoma.² Three pathophysiologic mechanisms for catecholamine toxicity in TCM have been suggested, none of which is mutually exclusive. Catecholamine toxicity may lead to vasospasm of distal coronary arteries, causing apical wall akinesis.³ Supraphysiologic levels of epinephrine may turn myocyte beta-receptors into a Gi-coupled receptor from a Gs-coupled receptor, thereby inhibiting cardiac contractility as a means for cardioprotection.⁴ A severe intracardiac gradient secondary to basal hypercontractility with left ventricular output tract obstruction may result in apical wall stress and ischemia.⁵ Nef, et al, summarized the concurrent effects of catecholamine overload as the development of general morphological alterations and disturbance of Ca²⁺ homeostasis.⁶ It was postulated that the relatively rapid recovery of cardiomyocytes often seen in this disorder were possibly due to protective mechanisms of Pi3K-akt signaling pathways.

Ingestion of ethanol results in well described effects on adrenergic activity. While initial or periodic ingestion can result in transiently increased levels of adrenergic activity, chronic or repeated exposure to ethanol results in global inhibition of catecholamine release and increased GABA pathway activation in the brain.^{7,8} Acute alcohol withdrawal, which can be precipitated by discontinuation or marked reduction in ethanol intake, may result in a 48-96 hour period of unopposed catecholamine activation and decreased central inhibition.⁸ The manifestations of this relatively unopposed adrenergic activity are stereotypic, and include tremulousness, anxiety, nausea, vomiting, diarrhea, tachycardia, and hypertension.⁹ While not demonstrated definitively in human subjects, the cardiomyotoxic effect of a hyperadrenergic state due to alcohol withdrawal has been demonstrated in animals.¹⁰ TCM occurring in the presence of AAW has rarely been described.

Case Report

A 45-year-old woman with a history of depression, anxiety, alcoholism, and recurrent Stage IIB left lower lobe pulmonary adenocarcinoma presented with epigastric pain, nausea, and emesis for 72 hours. These symptoms arose 24-48 hours after abrupt discontinuation of alcohol, with estimated prior daily consumption of 6-10 beers for 10 years. She also reported simultaneously discontinuing her antidepressant and anxiolytic medications. Physical exam showed tachycardia and tremulousness, but was otherwise unremarkable. An electrocardiogram revealed sinus tachycardia, right axis deviation, and T-wave inversion in the inferolateral leads. Troponin I marker was elevated and peaked to 0.974 ng/ml. TIMI risk score was 2.

Clinical Institute Withdrawal Assessment (CIWA) score was 9, with intermittent vomiting, mild anxiety, and moderate tremor. Transthoracic echocardiogram showed hyperkinesis of mid- to distal left ventricular walls with akinetic apical walls, and an ejection fraction of 30%-35%. Cardiac catheterization revealed minimal luminal irregularities of the main coronaries and no significant obstruction. A left ventriculogram was not performed. The patient received appropriate therapy for her AAW and supportive therapy for TCM with excellent clinical response.

Discussion

Four other cases of TCM occurring in the setting of AAW were identified. The initial case of TCM reported in the setting of AAW involved a 64-year-old man with alcohol dependence admitted with hypokalemia-related cardiomyopathy.¹¹ The patient had a cardiopulmonary arrest on hospital day five, and developed ST-elevations and T-wave inversions on ECG, with elevated CK-MB. Cardiac catheterization was normal, and left ventriculogram showed anterior left ventricular akinesis consistent with TCM.

A second case involved a 49-year-old woman who was admitted to a hospital with altered mental status.¹² She was started on an alcohol withdrawal protocol, but later became unstable, with ST elevations, T-wave inversions on ECG, and elevated cardiac biomarkers. Transthoracic echocardiogram showed apical wall akinesis of the left ventricle consistent with TCM.

The third case of TCM reported involved a 61 year old man who presented in acute withdrawal and with typical anginal symptoms.¹³ The patient had elevated troponins and T-wave inversions on EKG evolving to ST elevations in leads V3-V5. Ultimately, cardiac catheterization revealed normal coronary arteries with additional findings of ventriculomegaly and left ventricular apical ballooning.

A more recent case occurred in a 56-year-old man admitted for alcohol withdrawal, presented findings consistent with acute congestive heart failure, an EKG remarkable for pathologic Q waves in the precordial leads, and a mildly elevated troponin I and brain natriuretic peptide (BNP).¹⁴ Transthoracic echocardiogram revealed left ventricular apical ballooning, hyperkinesis of base segments, and an LVEF of 20%. Cardiac catheterization revealed no significant obstructive coronary disease, evidence of plaque rupture, or vasospasm.

Conclusion

The central role of excess catecholamines in the development of TCM is increasingly accepted. AAW is a well-described state of excessive adrenergic activity. Whereas TCM reported in the context of acute alcohol withdrawal remains rarely reported, this may reflect the possibility that cardiac function testing and an ischemic evaluation are not routinely undertaken as part of the evaluation and treatment of AAW. Clinicians should be aware of TCM as a possible complication of AAW and providers should consider the possibility of TCM in patients with signs and symptoms of chest pain or left ventricular dysfunction in patients with AAW.

The views of the authors do not represent the views of the United States Department of the Army or the Department of Defense.

Conflict of Interest

None of the authors identify any conflict of interest.

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Environmental Contamination and Public Health: The Kilauea Story

Fenix Grange MS; Barbara Brooks PhD; Yesid Romero MD, PhD; and Gary Gill

The Problem in Kilauea

In the last century, sugar plantations blanketed the Hawaiian Islands from Hilo to Lihue. Today, just a single plantation remains in operation. Yet many of these plantations leave behind a hidden legacy of contaminated soil from old pesticide mixing areas. The Hawai'i Department of Health (DOH) has tracked down many of these sites in remote areas, where there are few risks to the general public. Now, for the first time, DOH has discovered an old pesticide mixing site with alarmingly high levels of soil contamination persisting in the heart of a residential community. This article describes how the site was discovered and how government agencies have mobilized to clean it up and protect the public.

Under Chapter 128D, Hawai'i Revised Statutes, DOH has the responsibility to protect the public and the environment from exposure to hazardous chemicals that have been spilled or released into the environment.¹ The Hazard Evaluation and Emergency Response (HEER) Office employs environmental scientists, historians, human health toxicologists, and epidemiology specialists working side by side to discover and investigate where releases may have occurred. The team determines the nature and extent of contamination, how the contaminants may move or degrade in the environment, and identifies key pathways of human exposure.

For years, HEER has been systematically investigating soil contamination originating from historic sugar plantation operations in every corner of the islands. In the summer of 2010, a staff member from HEER was digging through historical documents to find "missing" pesticide mixing sites. She found photographs dating back to 1914 that showed a plantation worker in Kilauea, Kaua'i standing next to a large tank marked "poison." The search began for information that would describe exactly where the photos had been taken.

After coming up empty-handed from searching through the Hawai'i State Archives and other local resources, the team tracked down a 1966 Sanborn Fire Insurance map owned by a Connecticut map archive service that showed mill structures, including two structures identified as "poison mixing." By superimposing the historic maps over tax maps and current Google map images, the team pinpointed the current location of the contamination, and found that two single family homes and a commercial building appeared to sit on "ground zero" where pesticides were mixed and stored. Because soils may have been moving during grading for the new neighborhood, nearby homes and businesses were at risk as well.

DOH acted immediately to inform and protect residents, while rapidly gathering data to determine whether harmful pesticides were present in surface soils where they could present risks to human health and the environment.

Pesticide Risks in Hawai'i

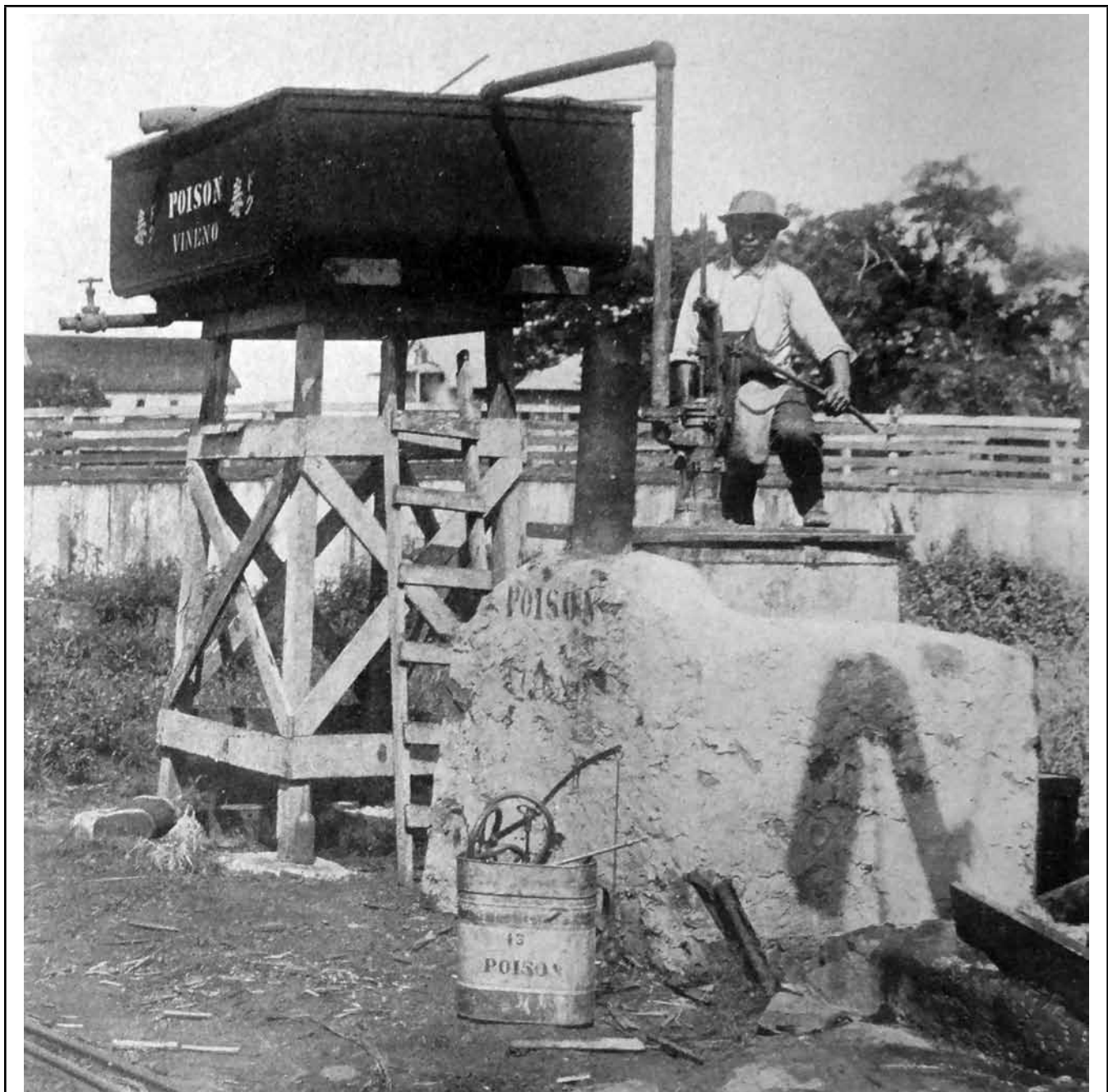
The most significant soil contamination in Hawai'i stems from historic pesticide mixing areas at former agricultural operations. Historically, pesticides were stored, mixed, and loaded in small, unobtrusive buildings located on old plantation lands, sometimes near the main mill; in other cases, the buildings were located on remote cane roads. As the Hawaiian sugar industry evolved, plantations consolidated and expanded. Pesticide handling operations were moved around, shared between plantations or relocated to meet changing plantation needs. As plantations began to close, many of the old structures were abandoned, ignored, and torn down. Development spread over agricultural lands with no institutional knowledge of the risks posed by these contaminated sites.

At the time of the Kilauea discovery, the HEER Office had already located and investigated 18 suspected pesticide mixing areas and found significant contamination at 15 sites. Some locations showed soil contamination hundreds of times above state action levels. While various residual pesticides have been identified at these sites, the key risk drivers are generally arsenic and dioxin. Widespread use of arsenic-based herbicides from 1915 through the 1940s is the likely source of the elevated levels of arsenic in soils.² From the 1940s through the 1970s, pentachlorophenol, which contains trace levels of dioxins, became the predominant herbicide used, leaving behind dioxin residues.³ DOH's site discovery activities suggest that there may be as many as 55 different locations statewide that housed pesticide mixing areas. The Department has made it a high priority to track down all of these historic pesticide mixing areas.

The Kilauea Sugar Company on Kaua'i operated from 1877 to 1971. In the 1970s, some of the old structures, including the pesticide mixing and storage buildings were torn down, the zoning was changed, and the property was placed for sale. Over the following decade, old plantation roads were converted to cul-de-sacs and the old mill site grew into a quiet residential community.

Outreach to the Public

Upon discovery that a residential neighborhood now stood on a historic pesticide mixing site, DOH staff immediately informed



Boiler and tank for stock solution at Kilauea. The solution is pumped with the small hand pump from the boiler into the tank whence it runs by gravity into the Supply Tanks or other conveyances. (Photo source: Larsen, L.D. "Progress in Arsenical Weed Control." *Planters' Record* Nov 1914:230.)

the affected property owners and began testing soils. HEER staff walked the properties with residents to assess exposed soils and describe simple actions community members could take to reduce risk. The most contaminated area was fenced to protect neighborhood children while the department investigated. Shortly after discovery, DOH held a meeting for neighborhood residents to provide information on the investigation, including data about the impacted properties, and to address questions and concerns. Meetings with community leaders and

local government officials began after meetings with affected residents were completed.

Once the extent of contamination and the number of properties affected was determined, DOH invited all Kilauea residents to a communitywide meeting. Leaders from the DOH assured residents that decisive action would be taken to protect the community and the agency would keep them informed about the ongoing investigation and future clean up plans. The state toxicologist and a medical toxicologist with the Rocky Mountain

Poison and Drug Center were available to answer questions from the public and medical professionals on the toxicity and potential health risk from the contamination.

Environmental Action Levels

State and federal environmental cleanup laws rely on scientific data to establish safe levels of individual contaminants in soil, water, and air. To evaluate whether a contaminated site needs to be remediated, DOH has calculated Environmental Action Levels (EALs) for common contaminants found in Hawai'i.⁴ The most protective EALs are set to safeguard the most sensitive land uses, such as lifetime exposures in single family homes. Somewhat higher levels of contaminants may be allowed where the use of the property limits exposure to the public.

High levels of arsenic and dioxin from the initial sampling clearly indicated that the former Kilauea pesticide mixing site was contaminated above the EALs. State and federal laws require the polluter to investigate and clean up any contamination they cause. In this case, because the plantation that caused the contamination had long been closed, DOH stepped in to conduct the investigation directly, using moneys set aside for this purpose in the Environmental Response Revolving Fund. Over the course of the next year, HEER completed four separate rounds of sampling to fully characterize the lateral and vertical extent of contamination. The most contaminated soils were found in the drainage ditch area on the commercial property. Bioaccessible arsenic concentrations in soil up to 1,800 parts per million (mg/kg) were reported, more than 80 times the State residential EAL of 23 mg/kg, with dioxin levels as high as 3,517 parts per trillion (ng/kg), some 15 times the EAL for dioxins and furans. For comparison, the natural level of arsenic in soil is typically less than 20 mg/kg and the level of dioxins is typically less than 20 ng/kg. More data can be found in the site investigation report.⁵

Results showed that contamination above action levels was limited to two residential properties and the drainage ditch area on a commercial parcel, extending to a depth of 10 feet. Residual contamination was also present under the paved roadway adjacent to the affected properties. Surface soil sampling conducted in eleven surrounding properties showed no evidence of significant contaminant migration from the pesticide mixing site.

The Department investigated further to determine whether arsenic or dioxin had spread elsewhere from the site. When the mill was operating, some 3 million gallons per day of wastewater from cane washing and other operations were discharged into Niu Stream and transported to the ocean. Research conducted in 1971 showed that the wastewater from the mill increased turbidity thirtyfold off the north coast of Kaua'i, deposited bagasse and other debris on intertidal reefs as far as three miles from the outfall and appeared to limit coral growth.⁶

Could the Kilauea Mill's drainage system have carried highly contaminated soils into Niu Stream, through neighboring residences and ultimately into the marine environment? While it is likely that some contaminated material went out to sea during

the 1970s, the sediment in the discharge water was probably "mill mud" washed from the cane itself, rather than soil from the pesticide mixing area. Data from samples taken in 2011 at different reaches in the downstream drainage demonstrated that sediments in the stream do not contain elevated levels of either arsenic or dioxin, and thus do not pose a threat to the stream ecosystem or downstream residents.

Arsenic Toxicity and Health Risk

While moderate levels of dioxins are present at the site, the high level of arsenic is the primary driver of risk. Arsenic is a naturally occurring element in the earth's crust; however, extensive historic use of arsenic-based herbicides further increases the amount of arsenic found in formerly cultivated soils. In Hawaii, DOH and others have found that more than 80% of arsenic is tightly bound to the iron- and aluminum-rich soils.^{2,7} When assessing risk for human exposure, only the fraction of arsenic in soil that is soluble and available to be absorbed in the gastrointestinal system (the bioaccessible fraction) is considered. Elevated levels of arsenic are not seen in groundwater in Hawai'i.

For most people, the diet, including foods such as fish, rice and seaweed, is the most significant source of arsenic.^{8,9} Nevertheless, unintentional ingestion of soil with high levels of arsenic can also be an important source of unhealthy exposure. Toddlers and most preschool children put their hands, toys, or other objects in their mouths, and these often have small amounts of soil and dust on them that the child swallows. While a typical child might eat 100 mg of soil a day (about a 1/3 of an aspirin tablet), some young children may eat more than that on occasion.¹⁰ Children with soil pica may eat unusually large amounts (grams or more) of soil greatly increasing their exposure to arsenic, dioxin and other soil contaminants.

Exposure to very high amounts of arsenic can cause both acute symptoms and long-term health effects. Symptoms of exposure to very high levels of arsenic may include stomach pain, vomiting, diarrhea and impaired nerve function that may result in "pins and needles" sensation in hands and feet and an increased risk of cancer. People who have been exposed to lower levels of arsenic in drinking water over long periods of time have had health symptoms that include changes in skin pigmentation (dark spots), thickening or warts on the palms of the hands and soles of the feet, and damage to heart, blood vessels, and the liver. These types of health effects have been identified in deliberate poisonings and in countries where drinking water is contaminated with high amounts of arsenic. They are not typically associated with soil exposures, and have not been documented in Hawai'i.

At this site, the drainage ditch posed the greatest potential hazard to small children at play due to its very high levels of bioaccessible arsenic. DOH calculated that acute, non-lethal, health effects from the drainage ditch soils could occur in a young child who may exhibit occasional soil pica and ingests teaspoons of soil at this site.¹¹ In order to discern any previous health effects since the neighborhood was built, DOH carefully reviewed state heavy metals biomonitoring data, conferred

with the Rocky Mountain Poison and Drug Center for reported poisonings, and met with Kilauea area physicians closely familiar with the community's health. To date, DOH has found no evidence of any health effects in people living on or near the former pesticide mixing area. Many of the symptoms of arsenic exposure, however, have other causes as well and would be extremely hard to associate with past pesticide exposures in the small rural populations living in Hawai'i.

Moving to Clean Up

The Site Investigation Report concluded that the soils in the ditch area and the affected residential properties must be remediated to allow safe long-term use for residents and workers. All areas of exposed, impacted soils at the two residential properties require removal of soil to a depth of one to two feet, installation of a visible barrier material and replacement of the excavated soil with clean fill to fully restore safe use and function of the yards.

Remediation of the highly contaminated soils in the drainage ditch area is more complicated. First, levels of arsenic contamination in the surface soils are too high to allow disposal in a local, municipal landfill. The cost of removing and shipping the contaminated soil to a hazardous waste facility in Canada or the US mainland is prohibitively expensive. Second, the ditch carries storm water from the neighborhood, so the remedy needs to preserve that function to ensure future flooding does not cause erosion or re-exposure of contaminated soils. The most feasible option to fix the drainage ditch will be to build a permanent cap that functions as a large stormwater swale while providing long term containment for contaminated soils.

DOH has spent approximately \$300,000 to complete the investigation in Kilauea. After considering the cost and technical complexity of implementing the cleanup and after conferring closely with property owners and the County, the DOH Director made the decision to request federal assistance from the US Environmental Protection Agency (EPA) Superfund Removal Program. This federal program provides a critical service to States facing high priority cleanups affecting their local communities.

In April, 2012, the EPA team flew to Hawai'i to begin consultation and pre-construction planning with property owners, the County and DOH. EPA, DOH, and Kaua'i County are planning to co-host a public meeting to inform the community of the upcoming removal action. The cleanup is expected to be completed in the summer of 2012. Because some contamination will remain on site at the three privately owned parcels and under the public roadway, the respective property owners will be responsible for implementing Environmental Hazard Management Plans and Deed Restrictions, under DOH oversight, to ensure that soils with residual contamination be managed properly in the future.

This work will bring to a close the pesticide contaminated soil problem discovered in the old plantation town of Kilauea on the island of Kaua'i. With the careful removal or containment of toxic soils, the residents of Kilauea will be protected and the life and commerce in the town can proceed with confidence.



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Role of the Health Sciences Library at the John A. Burns School of Medicine in Medical Education

Virginia M. Tanji MSLS, MEd; Director, Health Sciences Library, John A. Burns School of Medicine, University of Hawai'i at Manoa; and Leah R. Gazan MLISc; Information Services Assistant

Academic health sciences libraries, as supporting organizations within medical schools, find themselves in a world of constant change largely due to advances in information technology. The literature is rife with articles describing the tenuous landscape and prescribing solutions to maintain relevance in the face of change among health sciences libraries. The strategies provided to librarians recommend repurposing space, modifying services, and embedding oneself into the institution at large.¹⁻³ Since its opening in 2005, JABSOM's Health Sciences Library (JABSOM Library) staff has made decisions predicated on these recommendations as well as the evolving needs of the medical school. The Library has responded to the demands of the digital world amid a widespread economic downturn. It has been a "wild ride"; one that could only be enjoyed by embracing change.

From the Learning Resource Center to the Health Sciences Library

As a result of the digital explosion, the demand for print resources has dwindled in academic health sciences libraries. The vast spaces of the stacks, which house rows and rows of books and journals, are often underused. The information revolution has also altered the philosophy behind medical education.^{2,4} With enormous amounts of information accessible to students, the dogma imploring students to "learn everything" could not be sustained. At some institutions a more realistic goal of teaching students how to learn has been adopted.⁴ JABSOM is one such institution that adopted this tenet very early, even before information went digital. Its innovative and collaborative problem-based learning (PBL) curriculum fosters students into lifelong learners.

The JABSOM Library, like other academic health sciences libraries, considered the role of technology and collaborative learning when determining library space allocation within the Medical Education Building in Kaka'ako. Some health sciences libraries are currently finding it imperative to downsize their physical collections and designate the resulting space to include areas for technology and study that promote collaborative learning.^{2,3} Therefore, a space was designed at JABSOM that currently houses a single service desk; a computer lab; a quiet reading room that can double as a conference room; three group study rooms; and stacks containing individual study carrels and a journal collection covering the period 1980 to early 2000, all within approximately 14,500 square feet.

Creating the Ubiquitous Library: <http://hslib.jabsom.hawaii.edu>

In the digital world, a large print collection may not be the best way to connect library users to information. The physical space that was once considered the "library" has migrated to an online format. Currently, the "library's web page" is accessible to the user anytime and anywhere, creating an ubiquitous library.² The implications associated with maintaining a library that is primarily online and composed of electronic resources are complex and dynamic.

The nature of the print collection generally precludes abusive use; it is difficult to photocopy an entire book or journal and inconvenient to produce and distribute numerous copies of a journal article. The same cannot be said for the electronic collection. Academic health sciences librarians, then, must work closely with electronic resource vendors to establish license agreements that not only protect the providers' intellectual property but also meet the needs of library users who often want immediate access to information. Managing these competing interests, when the cost to acquire electronic resources is substantial and budgets are severely limited, is a problem. JABSOM Library staff address these issues through collection development, consortial purchasing, and resource sharing.

As the collection for the JABSOM Library was being developed, librarians made conscious decisions based on the premise, as early as 2003, that the future journal collection would be primarily digital. Backfiles of journals would be necessary, but it was determined that a start date of 1980 would enable the Library to meet, at minimum, 80% of its users' need for earlier material. A select group of print clinical journal titles from 1980 forward were purchased from The Queen's Medical Center's Hawai'i Medical Library in 2004 to be housed in the new library. In addition, JABSOM librarians worked collaboratively with the Collection Development Librarian and Electronic Resources Librarian at the University of Hawai'i at Manoa Library (UHM Library) to leverage purchases by eliminating the duplication of titles and licensing digital copies of journals for the entire university. This enhanced significantly the collection of journals available to students, faculty, and researchers at JABSOM and the rest of UH Manoa. JABSOM benefitted from the rich resources of the UHM Library which already included many medical journal titles from various publisher packages of journals and electronic books.

The JABSOM Library initiated and continues to manage a “buying club,” the Medical Libraries Consortium of Hawai‘i. It is a multi-type consortium which initially included eleven hospital libraries, two community college libraries with nursing programs, two private universities, and the JABSOM Library. Purchases are a la carte, ie, each library can choose to participate in the manner that best suits their needs. The plan has resulted in significant savings for all of the participating libraries. For JABSOM a rich resource of electronic clinical textbooks and journals that further support the medical school’s PBL curriculum are now available. This collection is evaluated each year based on usage. Since some titles are prohibitively expensive to acquire online and also because some students still prefer to study utilizing textbooks in print as well as electronic, a small print collection of clinical textbooks is maintained in the Reserve section of the library stacks. Standard clinical textbooks in e-book format remain basically html or PDF versions of the print. Some publishers are making these textbooks increasingly interactive with graphic, multimedia, and self-testing modules. Such developments may affect the way students interact with books and other materials. At JABSOM this is happening with PBL groups using iPads to develop and share their “learning issues” that are required. All incoming medical students, effective August 2012, will be required to have iPads.

JABSOM library staff members also engage in resource sharing with colleagues around the world. In addition, the libraries within the UH system share their print and electronic resources via intrasystem loans. Determining and defining the affiliated users who can access resource sharing services are complex and made even more challenging by copyright laws and license agreements. Users eligible for intrasystem and interlibrary borrowing can have print books delivered to the UH system library of their choice. Copies of articles delivered via email can be requested and received without entering the Library’s physical space. Because this resource sharing takes place on state, national, and international levels, it is possible for the JABSOM Library to provide eligible users with resources from anywhere in the world over the Web.

Additional services that can be provided over the Web include email reference service, innovative troubleshooting and teaching using Blackboard Collaborate, and customized medical subject guides. JABSOM Library users often ask their reference questions of the staff via email or telephone. Users often need help finding resources, navigating various databases, or constructing literature searches. Usually the issues that arise can be handled over email, but often the librarian and patron need to “see” the user’s computer screen. Instead of asking users to come to the library, JABSOM librarians have successfully used the desktop sharing feature of Blackboard Collaborate to troubleshoot problems or teach concepts that would ordinarily require face-to-face interaction. Some students and faculty still find the one-on-one in person and computer class hands-on training essential to their learning and to maximize their use of the resources.

JABSOM librarians use LibGuides, a web-hosting and authoring software, to create customized portals to high quality information.⁵ With LibGuides, librarians can cull the best resources for their users and present this information in organized, appealing, and interactive ways by using various Web 2.0 applications such as RSS feeds, videos, podcasts, and chat widgets. Customized guides are also mobile and smartphone ready. The Library’s LibGuides are subject based, but the literature states that course-specific LibGuides have greater use.⁵ Our experience confirms this. Currently JABSOM librarians are reorganizing the Library’s LibGuide collection and restructuring guides to be more course-specific, interactive, and valuable to users.

Embedding the Health Sciences Library into the Institution at Large and the Community

Academic health sciences librarians must get involved in the fabric of the institution and align themselves with its goals.³ JABSOM’s mission is “to teach and train high-quality physicians, biomedical scientists, and allied health workers for Hawai‘i and the Pacific”; its vision is ALOHA: to Attain Lasting Optimal Health for All.⁶ In support of this mission, hands-on training sessions are held in the library’s computer lab/classroom for Imi Ho‘ola students*, medical students, Residents, other JABSOM students, faculty and staff. During these sessions library staff members teach students to use effectively the online and print resources as they engage in their PBL curriculum. Training sessions have also been held for JABSOM faculty, Residents, and researchers both in the Library as well as at their respective departments in the hospitals and community. Training sessions have included the traditional introduction to resources, evidence-based searching of the literature, database searching (PubMed MEDLINE, Google Scholar), and reference/bibliographic management (EndNote). Sessions have been conducted in-person or transmitted over the Internet using web-based sharing programs.

The JABSOM Library is also an effective link between the medical school and the community. The staff supports the annual Community Health Fair planned by the medical students. The public area of the Library as well as the lobby of the Medical Education Building hosts various groups representing the medical school as well as local health care organizations. In 2012, hands-on workshops presenting resources from the National Library of Medicine were offered to health fair attendees.

Library staff members have also conducted workshops for Rotary Groups, estate planners, and as part of events organized by the University Foundation. The excellent, free, and authoritative resources from the National Library of Medicine (NLM) are always featured because these databases have been developed at NLM specifically for use by patients and lay consumers. The databases include not only disease information, but also

*A post baccalaureate program aimed to prepare students from disadvantaged backgrounds to succeed in medical school.

drug information, prevention information, and materials for patients in other languages. These are all freely available and participants generally have not been exposed to them.

<http://www.nlm.nih.gov/medlineplus/>
<http://clinicaltrials.gov/>
<http://www.ncbi.nlm.nih.gov/pubmedhealth/>

The JABSOM Library participates actively in the medical school. For example, the Director of the Library was a participant in the last LCME (Liaison Committee on Medical Education) accreditation review. The reviewers found the Library's collections and services to be compliant with the accreditation standards. Library staff members' knowledge and skills are kept current and their competence is enhanced by workshops and web-based seminars provided by the Pacific Southwest Regional Library at the University of California at Los Angeles, one of seven National Network of Libraries of Medicine, and programs hosted by the Medical Library Association. In addition, the Director has served on the National Library of Medicine Grants Review Committee and the Board of Regents of the National Library of Medicine.

Embracing Change

Advances in information technology present challenges to academic health sciences libraries. JABSOM Library staff members are committed to work with colleagues in the library and medical communities to provide space, resources, and services that meet the needs of the changing landscape of health care. The library welcomes the opportunity to embrace these challenges. The future holds opportunities for collaboration between the Library and the medical school faculty to support

the first Graduation Objective, "Fostering graduates who are lifelong learners." Library staff members help teach medical students to search and retrieve the biomedical information that they will learn to appraise critically and eventually apply to patient care. Through collection development, website development, and training sessions in the use of monographic and journal literature, the Library has played an integral role in the education of Hawai'i's health care community: future physicians and their patients, the public health workforce, communication disorder professionals, and researchers engaged in providing the best health care for the people of Hawai'i.

For academic health sciences libraries, the transition from print to electronic has taken place. The unknowns which remain are: Will the journal format change? Who will store the data that accompanies the research article? How will medical education cope with more and more information that needs to be integrated into the curriculum? Will the resources provided for medical education such as textbooks take on a different format? The Health Sciences Library at JABSOM is poised to continue to take on these challenges in support of the medical education enterprise.

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UPCOMING CME EVENTS					
Interested in having your upcoming CME Conference listed? Please contact Brenda Wong at (808) 536-7702 x103 for information.					
Date	Specialty	Sponsor	Location	Meeting Topic	Contact
July 2012					
7/19-7/22	GP, IM	JABSOM Dept of Native Hawaiian Health	Maui/Kaho'olawe	'Aipono Ola Pono Activity	Email: kkb@aloha.net
7/29-8/2	ORS, OSM, OTR	HCCME and Kaiser Permanente	Grand Hyatt Kauai, Kaua'i	20th Annual Update in Orthopaedic Surgery Conference	Email: kpos@sbcglobal.net
7/31-8/5	IM, FM, GP	JABSOM Center for Native & Pacific Health Disparities Research	Egan Civic & Convention Center, Anchorage, AK	Advancing Native Health & Wellness Conference	http://www3.jabsom.hawaii.edu/native/
August 2012					
8/10	AM, AP, GP, IM, PD	HCCME and Pu'ulu Lapa'au Hawai'i Physician Health Program	Queen's Conference Center	Evolution of Addiction: From Adolescence to Adulthood	Email: dirops@hawaii.php.org



WHAT WILL THIS LAD DO WHEN HE GROWS UP?

The Intel International Scientific and Engineering Fair first place award this year went to Jack Andraka, a 15-year-old high school freshman from Crownsville, Maryland. Competition is fierce with a top prize of \$75,000 in scholarship funds and \$12,000 in cash. Mr. Andraka has developed a paper sensor as a test for early detection of pancreatic cancer. Using a technique called Elisa (enzyme-linked immunosorbent assay), his sensor can determine the presence of mesothelin, a marker for early diagnosis of pancreatic cancer. Much like a dip-stick for blood or urine, his novel patent-pending device proved to be 28 times faster, 28 times less expensive, and 100 times more sensitive than current tests. Medical product people are knocking at his door, and he is working with patent attorneys from Johns Hopkins University.

WHAT GOES DOWN, MUST COME UP, OR MAYBE OUT.

The intragastric balloon is a liquid-filled sack placed in the stomach for up to six months to aid in weight reduction. The balloon was approved in Canada in 2006, and porky Americans have been streaming north. Patients have a sense of safety because placement is managed with a brief noninvasive procedure. Risks include nausea and vomiting the first few days, and rarely the bag deflates to obstruct the small intestine or cause gastric or bowel perforation. The federal Food and Drug Administration has initiated studies but has withheld approval. The fee runs about \$8,000 for an outpatient visit of less than one hour. Weight loss is from 13 to 34 pounds which patients often regain after the balloon is removed. A similar device was introduced in the United States in 1985, but the manufacturer stopped selling it in 1988. Clinical trials found that diet and exercise were equally effective for weight loss.

IT WAS EASIER AND SIMPLER WHEN NATURE WAS IN CONTROL.

The wonders of in vitro fertilization have proved to make remarkable strides in managing problems of infertility. It is a new and fascinating frontier with avenues for success, but also conflict. In Pennsylvania a woman and her husband had some embryos frozen shortly before the woman underwent chemotherapy for breast cancer. That was three years ago, and now the husband has filed for divorce. He feels the embryos should be destroyed, but the woman wants to use the embryos to have children. The initial court ruling was in favor of the woman, but the case is now on appeal before the Superior Court of Pennsylvania. Rarely do such cases reach judges. The few that have are scattered all over the map, according to law Professor Charles Kindregan at Suffolk University in Boston, an expert in assisted-reproduction law. Courts in other states have ruled that the rights of the person not wanting to be a parent should prevail. In his ruling Judge Bortner found that without use of the embryos, the woman wouldn't be able to bear children and adoption wasn't an alternative. Counsel for the woman argued the couple never made use of the embryos contingent upon them staying together. The man's attorney stated, "The constitutional right to avoid procreation is well defined."

WHAT'S IN A NAME? ABOUT \$1900 IN THIS CASE.

Avastin was developed for cancer therapy and hit the US market in 2004. Some clever scientists at Genentech, Inc. tested a similar compound for macular degeneration and called it Lucentis. The drugs are highly similar and work in the same fashion. Lucentis won regulatory approval in 2006 with a price tag of \$1950 per monthly dose. In 2010, Lucentis was the single biggest expenditure in the pharmaceutical budget of Medicare Part B running to almost \$2 billion. Centers for Medicare and Medicaid Services (CMS) funded a program comparing the drug with the cheaper Avastin. A two-year study published in the journal

Ophthalmology brought results showing that the drugs Avastin and Lucentis are roughly equal at preserving vision in elderly patients with macular degeneration. Avastin, when used in eye disease, costs about \$50 a dose compared with about \$1,950 for Lucentis. At a factor of 40 to 1, CMS (and us taxpayers) can save a bundle.

WHY NOT KICK OVER ANOTHER HORNET'S NEST?

You have to give the US Preventative Services Task Force warm respect for fearlessly attacking conventional medical practices. Heavy controversy was engendered with recommendations regarding screening for breast cancer, and now they have done it again. The latest hullabaloo is about recommendations to discontinue the prostate specific antigen screening tests for prostate cancer. "There is small potential benefit and a significant known harm. The PSA test should not be part of your checkup," said Professor Virginia Moyer of Baylor College of Medicine who chaired the task force. Of 1,000 screened men, as a side effect of treatment, 40 will suffer impotence or urinary incontinence, two will have heart attacks or strokes, and one will have a blood clot in lungs or legs. "This is outrageous. PSA testing is a boon to men. They are throwing it out because they underestimate the benefits and overstate the harm," said Dr. William Catalona, urologist at Northwestern University Feinberg School of Medicine. The American Urological Association also released a statement disputing the recommendation. PSA testing became a routine to test for prostate cancer beginning in the 1990s. The precise level of PSA in the blood or patterns of PSA change deemed suspicious varies from practice to practice.

WHO IS WATCHING THE STORE?

Want to buy a case of wine? How about a twelve-pack of Heineken? According to findings published in the Archives of Pediatrics and Adolescent Medicine, a research team of eight young adults, ages 18 to 20, tried to buy alcohol from 100 online vendors. If websites asked for identification, the buyers could give a false age, but the study required them to provide real ID cards if requested. Among the retailers, 12 rejected the sale because of the buyer's age. Another 16 were stopped when the delivery driver checked the recipient's ID. Some vendor's would not ship out of state, and a few credit cards were denied. Over all, 45 of 100 order attempts proved successful in putting booze in the hands of minors. We have one more problem in our electronic world of the great new millennium.

ADDENDA

- The Agency for Healthcare Research and Quality reported that 1% of the population accounted for more than 20% of health care spending in 2008. Only 3% of total health care expenditures were used on individuals categorized in the lower half of health care spending.
- One-third of the entire population of Sweden emigrated to the United States in the 19th century.
- John Kerry's wife Theresa Heinz, heiress to the Heinz ketchup fortune, is worth over \$500 million. Rumor has it that she is a little tight with money, but if you hold her upside down and shake her just right, the money will flow.
- Never go to a costume party dressed as a piñata.
- I used to be quite an athlete, big chest, hard stomach. But all that's behind me now.
- Columbus discovered America. He was drawn to the lights from the indian casinos.

ALOHA AND KEEP THE FAITH rts

(Editorial comment is strictly that of the writer.)