Incorporating the 2012 Cancer Registry Statistical Review

Cancer Program

2013 Annual Report

The University of Kansas
Cancer Center

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NATIONAL CANCER
2013–14

NCI·CC
A Cancer Center Designated by the National Cancer Institute

Chair's Report

Joshua M.V. Mammen, MD, PhD, FACS

Cancer Committee Chair
Joshua M.V. Mammen
MD, PhD, FACS

I am pleased to share our cancer registry's 2013 annual report for the American College of Surgeons' Commission on Cancer. More than 1,500 hospitals in the United States and Puerto Rico are CoC-accredited, representing only 30 percent of all institutions but more than 70 percent of all new cancer cases diagnosed annually.

This year, the CoC awarded our cancer program three-year accreditation with commendation. We received commendation on all seven quality standards, which has qualified us for the Outstanding Achievement Award. Only 18.5 percent of more than 400 eligible programs received this honor. It signals to patients that here they receive access to the full scope of subspecialty care and services not available at all cancer treatment facilities. For patients and their families, accreditation is an important measure of quality care.

Since attaining National Cancer Institute designation in 2012, we continue to enhance our cancer program. Our Clinical Research Center experiences rapid growth. Nine physicians currently participate in the early phase program, including thoracic oncologist Takefumi Komiya, MD, PhD, from the National Cancer Institute and the program's second full-time clinician. More patients are participating in cancer clinical trials than ever before.

Over the last year, we have established or enhanced prevention clinics for breast, lung, prostate and thyroid cancers. These clinics are detecting cancer earlier through state-of-the-art screening technology. Genetic testing and cancer risk assessment community programs are providing education for individuals to make informed decisions about their treatment options.

Our new Sarcoma Center and Breast Surgery Center at our Indian Creek campus in southern Johnson County have increased patient access to nationally renowned experts. The new partnership with North Kansas City Hospital and our strengthened partnerships with community hospitals through Midwest Cancer Alliance bring patients access to world-class cancer care close to home. Over the past year, 61 patients outside our immediate area received consultations, second opinions or clinical trials through MCA.

This year, we focused on tailoring our care to meet each cancer patient's unique needs from cellular therapies to education on improving nutrition and reducing stress. Through generous gifts from our donors, we enhanced our nurse navigator program. We now have 10 site-specific cancer nurse navigators, which distinguishes us as having the largest navigator program in the region and one of the most extensive in the nation. From their first call, patients and their families receive the information they need to confidently move forward.

The University of Kansas Cancer Center is dedicated to the eradication of cancer. As we continue to pursue this goal, we will continue to conduct new research, translate our findings into innovative therapies and investigate new ways to prevent and diagnose cancer. Together, we will continue to ensure that the patients and families we serve can expect the highest level of care from diagnosis through treatment and survivorship.

Cancer Registry Report

The University of Kansas Cancer Registry operates under the direction and guidance of the Cancer Committee and is located within Health Information Management. The Cancer Registry at our facility became accredited by the American College of Surgeons in 1934, and has maintained accreditation since. The reference date for the organization is 1947, and the current database still contains data pertaining to patient demographics, cancer diagnosis, treatment information, staging and outcomes since that time. There have been more than 94,941 cases accessioned into the registry for the accession years of 1947 through 2012. The Registry participates in the American College of Surgeons' Commission on Cancer Approvals Program. The Commission on Cancer, or CoC, provides standards and program review of healthcare facilities participating in its program.

The Cancer Registry staff grew in 2013 from a staff of six to 15. There are 10 certified tumor registrars, or CTRs, on staff. The rest are CTR-certification eligible and plan for acquisition of the accreditation prior to 2015. The cancer registrars collect and analyze all reportable and supplemental data, document Cancer Committee attendance and provide a Cancer Registry report for each meeting, document tumor conference information, supply reports of database information to medical and administrative staff and report all cases to the Kansas Cancer Registry or the Missouri Cancer Registry. Our Cancer Registry also follows our patients annually to determine health changes and provide information for survival and outcomes data. The registrars are also assisted part-time by a Health Information Management computer specialist, who maintains the system as necessary and a volunteer to help with follow-up duties.

The registrars collectively are members of the National Cancer Registrars Association (NCRA), the Kansas Cancer Registrars Association (KCRA), the Kansas City Area Tumor Registrars Association (KCATRA), the Missouri State Tumor Registrars Association (MOSTRA) and the Arkansas Cancer Registrars Association (ACRA). All participate in educational events annually in order to maintain their certification status, and the CTRs attend a regional or national cancer conference at least every three years as well.

In 2012, 5,731 new cases were added to the Registry, with 4,990 of those cases being analytic (cases diagnosed and/or treated by one of the facilities of The University of Kansas Cancer Center for the patient's first course of treatment).

Cancer Registry data is available for multiple uses, including the reporting of results and evaluation of quality of care, as well as for research needs and educational purposes. Periodic follow-up is an important function of the Registry and increases the likelihood that patients will receive appropriate medical care for early detection and treatment of recurrent or new cancers. This early detection can potentially improve chances of survival. Information obtained through follow-up provides researchers and clinicians with a means to study the disease process and efficacy of treatment modalities. The follow-up rate for all analytic patients from the Cancer Registry reference date of 1947 is 86 percent. The CoC requires this rate to be at least 80 percent. The follow-up rate for analytic patients diagnosed within the last five years is 91 percent, which also exceeds the CoC requirement for the five-year rate set at 90 percent.

The Cancer Registry assists in the collection of the cancer conference data. Tumor conferences were presented on a weekly, bimonthly or monthly basis by a multidisciplinary team consisting of physician representatives from many different departments.
The University of Kansas had nine different cancer conferences in 2012 that were tracked to provide consultative services to patients and help educate the medical staff and other healthcare professionals. National treatment guidelines, staging, prognostic indicators and clinical trial options were also discussed at these conferences. There were 233 tumor conferences held in 2012, which included multidisciplinary, breast, GI, lymphoma and myeloma, head and neck, thoracic, bone marrow, thyroid and neuro-oncology. A total of 855 cases were presented at these various conferences.

The Cancer Registry is staffed by the following Health Information Management personnel:

- Theresa Jackson, RHIA, director
- Tim Metcalf, BS, CTR, manager
- Ashley Wagner, CTR, lead registrar
- Beth Barnlund, RHIT
- Elaine Casper, RHIT, CTR
- Cari Dobosz, RHIT
- Ian Duff, BS, RHIA, CTR
- Kathrine Greene, RHIT, CTR
- Marsha Klein, BS, RHIT, CTR
- Joyce Knapp, RHIT, CTR
- Garrett Neiss, RT
- Mary Beth Piranio, BA, RHIT, CTR
- Andrea Reynolds, RHIT
- Marcelo Saculles, RHIT
- Terry Sigmund, CTR
- Marji Smith, RHIT, CTR
- Allison Greene, volunteer

2012 Research Roundtables

The University of Kansas Cancer Center and the Kansas Masonic Cancer Research Institute conduct a variety of educational activities. These include research roundtables, tumor conferences, symposia and interdisciplinary conferences. In addition to providing supplemental education to our students, physicians and researchers, the purpose of these activities is to achieve a greater level of collaborative research and multidisciplinary interaction.

FEBRUARY 11

Annual Review of ASH
Andrew Evens, DO, MSc
The University of Massachusetts Medical School
Sid Ganguly, MD
Nisreen Haideri, MD
Suman Kambhampati, MD
Joseph McGuirk, DO
Christopher Sirridge, MD
The University of Kansas Cancer Center
Animesh Pardanani, MBBS, PhD
Mayo Clinic
Farhad Ravandi-Kashani, MD
The University of Texas MD Anderson Cancer Center

FEBRUARY 24

Dawood Sayed, MD
The University of Kansas Cancer Center
"Interventional Pain Management Options in Cancer Pain"

MARCH 3

Lung Cancer Symposium
Chao Huang, MD
Rashna Madan, MD
Gregory Muehlebach, MD
Fen Wang, MD, PhD
The University of Kansas Cancer Center
Corey Langer, MD, FACP
The University of Pennsylvania Abramson Cancer Center

MARCH 22

Barry Skikne, MD
Celgene Pharmaceuticals
"Therapy Strategies in AML and MDS Utilizing Azacitidine and/or Revlimid"

MARCH 29

GI ASCO Review 2012
Joaquina Baranda, MD
The University of Kansas Cancer Center
A. Craig Lockhart, MD
Benjamin Tan, MD
Washington University in St. Louis
Robert Wolff, MD
The University of Texas MD Anderson Cancer Center

MARCH 30

Robert Wolff, MD
The University of Texas MD Anderson Cancer Center
"Pancreatic Cancer: A Clinician's View"

MAY 10

Jerald Radich, MD
Fred Hutchinson Cancer Research Center
"Chronic Myeloid Leukemia: Translating State-of-the-Art Practice to Patient Care"

MAY 31

Morie Gertz, MD
Mayo Clinic
"Role of the Immunoglobulin Free Light Chain Nephelometric Assay in the Management of Plasma Cell Dyscrasias"

JULY 13

L. Russell Waitman, PhD
University of Kansas School of Medicine
"Using Informatics and HERON to Advance Your Research"

AUGUST 9

Ilene Weitz, MD
University of Southern California Medical Center
"Early Diagnosis and Intervention of PNH and aHus"

OCTOBER 4

Amrita Krishnan, MD, FACP
City of Hope Cancer Center
"Optimizing Care for Patients with Relapsed/Refractory Multiple Myeloma"

NOVEMBER 10

Mazin Al-Kasspooles, MD
Shrikant Anant, PhD
Joaquina Baranda, MD
Carol Connor, MD
Christopher Lominska, MD
Melissa Mitchell, MD
Priyanka Sharma, MD
Mark Thompson, MD
The University of Kansas Cancer Center
Daniel Stanley, MD, FACS
University of Tennessee College of Medicine
"Multidisciplinary"

NOVEMBER 29

Brady Stein, MD
Northwestern University Feinberg School of Medicine
"Myelofibrosis: Research to Practice – Are We Making a Difference?"

2012 Tumor Conferences

Type of Conference	Interval	Number of Conferences	Number of Analytic Cases Presented
Multidisciplinary	Weekly	38	82
Site-focused: Bone Marrow	Weekly	34	114
Site-focused: Breast	Weekly	26	88
Departmental: Head and Neck	Bimonthly	27	210
Site-focused: Lymphoma/Myeloma	Weekly	28	40
Departmental: Thoracic	Weekly	32	109
Site-Focused: Thyroid	Monthly	12	78
Neuro-oncology	Bimonthly	13	65
Site-focused	Weekly	23	69
Totals		**233**	**855**

2012 County Distribution

Kansas by Place of Residence at Diagnosis
Johnson: 22.39%
Wyandotte: 8.89%
Leavenworth: 2.78%
Shawnee: 2.60%
Douglas: 1.52%
Other Kansas: 14.12%
Total Kansas: 52.30%

Missouri by Place of Residence at Diagnosis
Jackson: 20.93%
Clay: 8.43%
Platte: 3.68%
Cass: 3.02%
Buchanan: .84%
Other Missouri: 9.64%
Total Missouri: 46.54%

All Other States: 1.06%
Unknown County or State: 0.10%

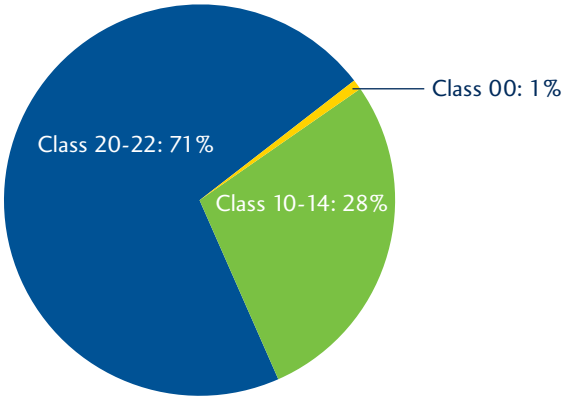
The University of Kansas Hospital – 2012 Primary Site Table*

PRIMARY SITE	ANALYTIC	NONANALYTIC	TOTAL
Oral Cavity	**227**	**21**	**248**
Lip	8	0	8
Tongue	69	9	78
Oropharynx	9	0	9
Hypopharynx	3	0	3
Other	138	12	150
Digestive System	**759**	**114**	**873**
Esophagus	53	7	60
Stomach	62	0	62
Colon	170	45	215
Rectum	124	22	146
Anus/Anal Canal	26	5	31
Liver	153	10	163
Pancreas	123	8	131
Other	48	17	65
Respiratory System	**646**	**79**	**725**
Nasal/Sinus	17	0	17
Larynx	67	13	80
Lung/Bronchus	556	66	622
Other	6	0	6
Blood & Bone Marrow	**386**	**89**	**475**
Leukemia	206	49	255
Multiple Myeloma	106	25	131
Other	74	15	89
Bone	**11**	**3**	**14**
Connect/Soft Tissue	**45**	**0**	**45**
Skin	**214**	**36**	**250**
Melanoma	196	32	228
Other	18	4	22
Breast	**1,030**	**94**	**1,124**
Female Genital	**295**	**40**	**335**
Cervix Uteri	42	4	46
Corpus Uteri	150	8	158
Ovary	66	21	87
Vulva	21	3	24
Other	16	4	20
Male Genital	**386**	**80**	**466**
Prostate	335	77	412
Testis	44	3	47
Other	7	0	7
Urinary System	**296**	**70**	**366**
Bladder	134	38	172
Kidney/Renal	151	28	179
Other	11	4	15
Brain & CNS	**174**	**15**	**189**
Brain (Benign)	10	0	10
Brain (Malignant)	82	8	90
Other	82	7	89
Endocrine	**154**	**28**	**182**
Thyroid	106	17	123
Other	48	11	59
Lymphatic System	**286**	**63**	**349**
Hodgkin Lymphoma	34	5	39
Non-Hodgkin Lymphoma	252	58	310
Unknown Primary	**48**	**6**	**54**
Other/Ill-Defined	**33**	**3**	**36**
All Sites	**4,990**	**741**	**5,731**

*Includes malignant and reportable benign cases.

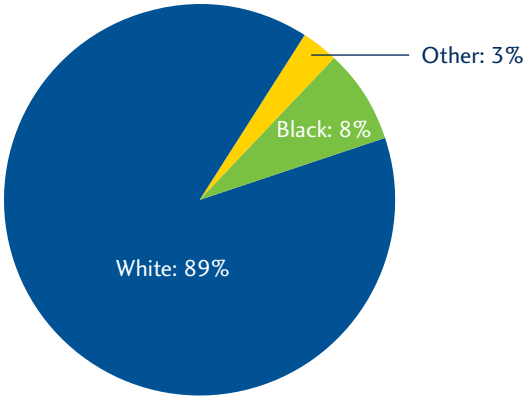
2012 Statistical Graphs – Analytic Cases

Class Distribution

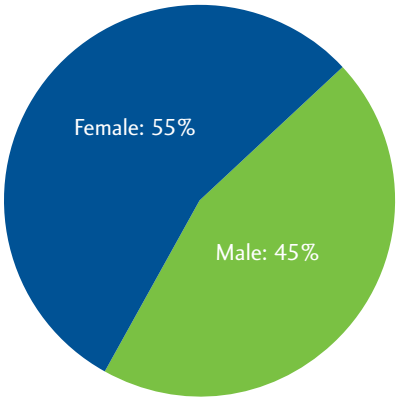


Class 00: Diagnosed here, all treatment elsewhere.
Class 10-14: Diagnosed here, all or part of first-course treatment here.
Class 20-22: Diagnosed elsewhere, all or part of first-course treatment here.

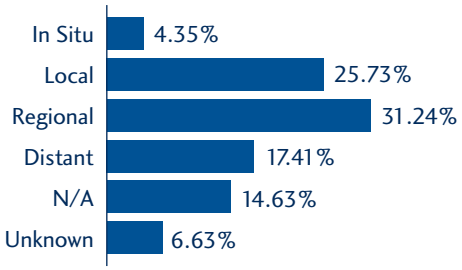
Race Distribution



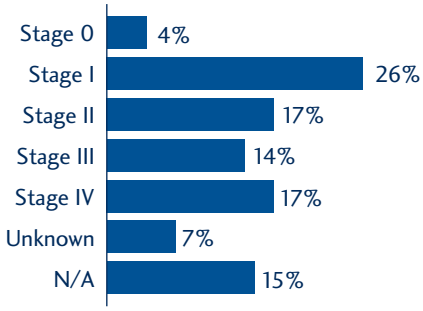
Sex Distribution



SEER Summary Stage at Diagnosis (n=4,990)

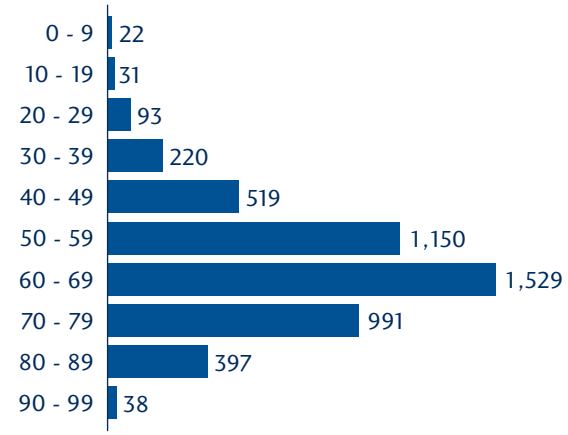


AJCC Stage Group at Diagnosis* (n=4,990)

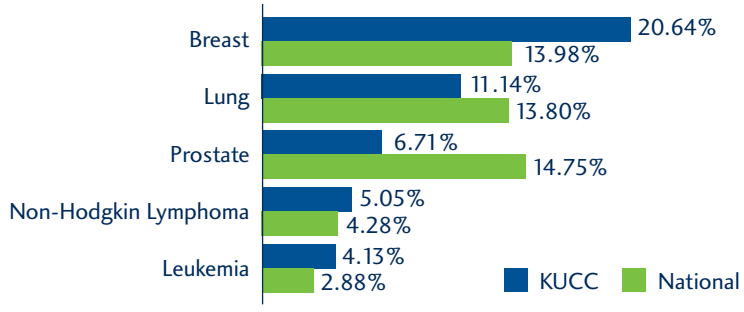


*Class 00 not included/required by CoC.

Age at Diagnosis (n=4,990)



Top Five Primary Sites: American Cancer Society Statistics



Evaluation of OnControl® Powered Bone Access System by Vidacare®

Catherine Glennon, RN, MHS, NE-BC, OCN

The University of Kansas Cancer Center

Background

Bone marrow aspiration and biopsy is an invasive procedure associated with risks such as hemorrhage, infection and pain. It is considered one of the most valuable diagnostic tools to evaluate hematologic disorders. Indications have included the diagnosis, staging and therapeutic monitoring for hematologic disorders such as, but not limited to, chronic lymphocytic leukemia, Hodgkin and non-Hodgkin lymphoma and multiple myeloma. Furthermore, evaluation of cytopenia, thrombocytosis, leukocytosis, anemia and iron status can be performed.

Traditionally, a skin incision is made with a small surgical blade, through which the bone marrow aspiration needle is inserted. Once the needle contacts the bone, it is advanced by slowly rotating until the cortical bone is penetrated and the marrow cavity is entered. Using a syringe, a small amount of bone marrow is aspirated. Aspiration of the marrow provides a cytologic assessment including morphology and differential cell count. Biopsy provides overall cellularity, detection of focal lesions and extent of infiltration.

A motorized driver with a specially designed, patented needle set to penetrate the bone while providing controlled insertion of the cannula with a lithium-powered driver was introduced. This device, known as OnControl® Powered Bone Access System by Vidacare®, is FDA-cleared and has been commercially available in the United States since 2007. (See Figure 1.) OnControl provides intraosseous vascular access and offers (Wise-Draper, Sacher, Goldberg and Vergidis, 2013):

- Comfort – the process is designed to be easy on both the patient and clinician.
- Speed – the process includes a powered driver, which facilitates rapid insertions.
- Success – the process is optimized for a successful outcome like never before.

By providing greater ease and rapid insertion of the needle set, the device reduces levels of patient pain. Early data from aspiration needle insertions using the OnControl System reflected a median pain score of 2.0 (scale of 0-10), with only 7 percent of patients scoring pain at a level above 6.0. (Wise-Draper, et al., 2013).

A comprehensive literature review reported the device decreases morbidity/complications; improves quality of life; improves clinical and operational efficiency; improves patient satisfaction and improves patient and staff safety.

A cancer center core group, consisting of a hematologist, pathologist, blood and marrow transplant (BMT) nurse practitioner (NP), procedure room registered nurse (RN) and the director of nursing, formed to design a study to review outcomes in the outpatient setting using the motorized device. Other oncology staff were included as needed or by personal interest through the study development.

Fig. 1: OnControl® Powered Bone Access System by Vidacare®

Objective

The purpose of this quality study was to introduce the new OnControl device and assess:

- Patient satisfaction – less time for procedure and decreased pain
- Provider satisfaction – ease of use, employee health and safety
- Quality of specimen
- Number of complications

Method

This study's target was 20 patients, excluding patients with a diagnosis of multiple myeloma. Patients with a diagnosis of osteoporosis, osteopenia, steroid use, or have had a motorized drill used on previous bone marrow aspiration/biopsy procedure, or have had anticoagulation therapy were included in the study. However, these factors were noted on the evaluation tool.

The two-needle technique was required by providers using the iliac crest. An informed patient consent, which included review of procedural information, potential complications and education regarding the device, was completed prior to the procedure.

continues

The quality study, approved by the University of Kansas Medical Center Human Subjects Committee, was limited to one MD and one NP, both trained in the use of the device. The study began April 26, 2013, and concluded September 20, 2013.

MEASURES

Using an OnControl template, a two-page comprehensive evaluation tool was developed and used for this study. Study results are presented by evaluation category. (See Figure 2.)

FIG. 2: EVALUATION CATEGORIES

- **Patient History/Status**
- **User/Procedure Information**
- **Post-Procedure Patient Information**
- **Pathology Trephine Review**
- **24-Hour Post-Follow-Up**

RESULTS

For outcomes unequal to 22, data points are missing.

Patient History/Status

- Twenty-two procedures were performed; three of the procedures were with one unique patient.
- Ages ranged from 36 to 84; the average was 64.2.
- Weights ranged from 102 to 228.80 pounds; the average was 184.9.
- The number of prior bone marrow aspiration/biopsy procedures ranged from two to five by the majority of patients (13), followed by seven who had more than six.
- Previous pain intervention for bone marrow aspiration/biopsy procedure was solicited and included Ativan, Morphine Sulfate (MS) IR, Other and None. The majority (17) reported None, followed by Ativan and oxycodone = 1; Ativan and MS = 1 and Versed (midazolam) = 1.

User/Procedure Information (See Figure 3.)

- Performed by MD = 9; NP = 13
- Aspiration successful/# attempts: Yes/1 = 20; Yes/2 = 1; No = 1
- Aspiration procedure: Easy = 8; Average = 12; Difficult = 2.
- Biopsy successful/# attempts: Yes/1 = 13;Yes/ 2 = 6; No = 0
- Biopsy procedure: Easy = 8; Average = 12; Difficult = 2.

continues

- Actual procedure time (Lidocaine – needle out): <5 min. = 0; 5-15 min. = 17; >15 min. = 3
- Pain management: None = 17; Ativan and oxycodone = 1; Ativan and Morphine Sulfate = 1.
- Prior provider OnControl procedures completed: >9 = 22.
- Preference to use again: Yes = 20; Undecided = 1
- Adequacy assessment by medical technician during procedure: Adequate = 16; Few flecks = 4; No flecks = 1.

Post-Procedure Patient Information

When patients were asked their preference for the use of OnContol in the future, 16 stated yes, one stated no and one had no preference. Patients who preferred this method stated it was faster (11), and experienced less or no pain (2). When asked what was least liked, two patients stated it was the sound (1) and drill extraction (1). Seventeen patients responded to the question of whether there was adequate product education/explanation provided; 16 stated yes and one stated no.

A visual analogue scale (VAS) was used for patients to report their level of pain from zero (no pain) to 10 (worst pain possible). Post procedure, patients rated their pain score with previous manual biopsy, if applicable, compared to current OnControl procedure. Overall, pain was less or the same with OnControl. There was one report of increased pain from a patient who had Versed with the previous procedure. Results are displayed in Figure 4.

PATHOLOGY TREPHINE REVIEW

The biopsy slides from the specimens that were obtained by the drill were evaluated for overall quality, aspiration artifact, intrastromal hemorrhage, length of core biopsy specimen and crush artifact. The specific statistical evaluation is in process. Overall, the specimens obtained with the drill showed an increased amount of focal intrastromal hemorrhage, but were adequate for evaluation. The aspirates were obtained with a traditional Illinois needle, not the drill.

24-HOUR POST-FOLLOW-UP

Twenty-four hours after the procedure, the procedure room nurse assessed the patient by phone.

- Ratings of overall experience: Very good = 8; Good = 8; Poor = 0
- 24-hour post-pain scores: 0 = 11; 2 = 1; 3 = 3; 4 = 1
- Concerns with site: None = 17.

Fig. 3: User/Procedure Information Excerpt From Evaluation Tool

User/Procedure Information					
Physician	Mid-Level	Fellow	Resident	Other	
Aspiration successful/# attempts:		Yes/#		No/#	
Aspiration procedure:		Easy	Average	Difficult	
Biopsy successful/# attempts:		Yes/#	No/#	NA-Not Ordered	
Biopsy procedure:		Easy	Average	Difficult	
Actual procedure time Lidocaine needle in/final asp/bx needle out:		>15 min	5-15 min	<5 min	
Notes or comments from provider:					
Today's patient pain management:		Ativan 0.5 mg po	Ativan 1 mg po	Morphine Sulfate IR 15 mg po	No meds
Prior Provider OnControl procedures completed:		1-4	5-8	>9	
Would you use OnControl again?		Yes	No	Undecided	
Statement of Adequacy by med tech:		No flecks	Few flecks	Numerous Flecks/adequate	

Fig. 4: Patient Pain Assessment

Patient	Manual biopsy pain level	OnControl biopsy pain level
1	3	3
2	1	1
3	4	3
4	9	2
5	10	1
6	8	7
7	2	1
8	6	3
9	1	1
10	2	2
11	4	4
12	8	3.5
13	4	0
14	3	3
15	2	0
16	3	3
17	2	2
18	1	5

Conclusion

This quality study provides evidence to support the aim of the study. Patient satisfaction was demonstrated by overall positive feedback in all categories assessed. Providers were satisfied with the device and the time required performing the procedure. The quality of the biopsy is adequate for evaluation, with statistical studies comparing the drill specimens to the non-drill specimens in progress. No complications were reported. Results suggest the use of a powered bone marrow biopsy device could be beneficial in the outpatient setting. However, a statistical analysis of the data is required.

Sources

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Acknowledgements

Team members: Suman Kambhampati, MD, principal investigator, Mary Luder, NP, Janet Woodruff, MD, and Alison Connely, RN.

Thyroid Cancer Patient Care Evaluation–2012

Peter J. DiPasco, MD
Surgical Oncology and Endocrine Surgery
Joshua M.V. Mammen, MD, PhD, FACS
Surgical Oncology and Surgery
The University of Kansas Cancer Center

Prevention, Screening and Detection

Thyroid cancer occurs when the cells within the thyroid gland or parathyroid tissues undergo mutations or genetic changes. The cancerous cells begin to undergo rapid replications and lose their ability to die, which causes an accumulation of abnormal cells, forming a tumor. This tumor can spread to adjacent tissues and even continue to metastasize throughout the body.

Though there are several risk factors associated with thyroid cancer, the direct cause of this disease is uncertain.

Some known risk factors for thyroid cancer include:

- Being female
- History of goiter, enlarged thyroid and thyroid nodules
- Family history of thyroid cancer
- Radiation exposure
- Certain genetic syndromes

Unfortunately, other than avoiding radiation exposure and ensuring iodine levels prevent a goiter, not much can be done to prevent this cancer.

Furthermore, there is no ideal screening method for this cancer, since other than feeling a lump, there is no easy way to identify this disease. As we age, the body tends to develop thyroid nodules that are not cancerous as well. Most thyroid cancers are actually discovered when the patient feels a lump, but others may only be found per radiologic examination.

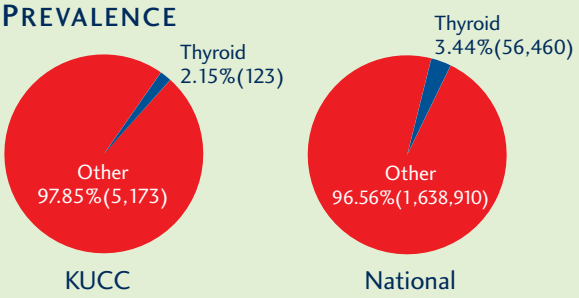
Most Common Types of Thyroid Cancer

Differentiated types

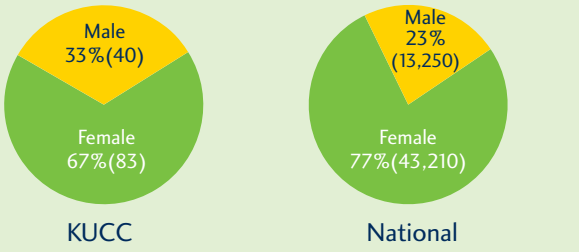
- Papillary carcinoma – Eight of 10 thyroid cancers are papillary carcinomas.
- Follicular carcinoma – The second most common and one of 10 thyroid cancers nationally.
- Hürthle cell – A subtype of follicular carcinoma and also called oxyphilic or oxyphil cell carcinoma.

Fig. 1: 2012 Thyroid Cases Versus Other Cancer Cases

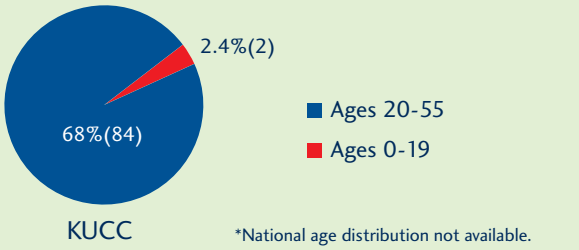
Prevalence



Gender Distribution



Age Distribution*



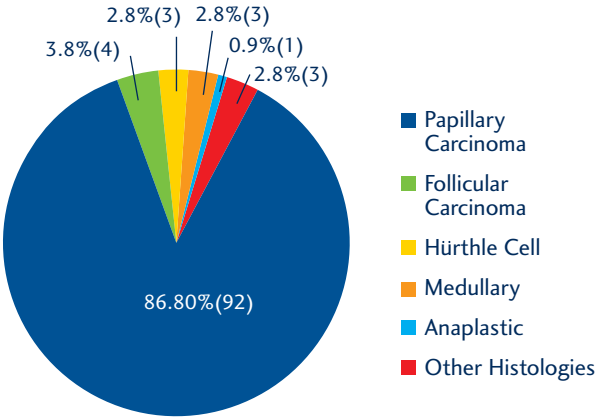
*National age distribution not available.

More aggressive types

- Medullary – Roughly 4 percent of thyroid cancers. It is often not as easily detected, so may metastasize to other parts of the body prior to diagnosis.
- Anaplastic – Also called undifferentiated thyroid cancer. It is usually about 2 percent of thyroid tumors and very aggressive compared to differentiated types.

For statistical purposes, we examined the breakdown of histologies for the 106 analytic thyroid cases. (See Figure 2.)

FIG. 2: HISTOLOGY DISTRIBUTION OF ANALYTIC 2012 THYROID CANCERS

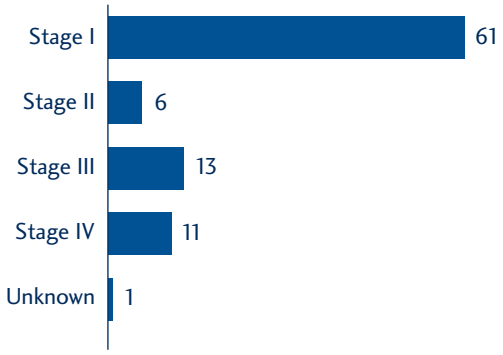


HISTOLOGY-FOCUSED EXAMINATION OF TREATMENT

To identify whether appropriate national treatment guidelines are followed, we examined the most common histology and the most common stage within that population and compared it to the treatments received. This revealed opportunities for treatment that may not have been pursued.

Since papillary carcinoma is the top histology within this group, we first looked at the breakdown of AJCC Stage for the papillary carcinomas, which comprised roughly 87 percent of our thyroid cancers. (See Figure 3.)

FIG. 3: PAPILLARY CARCINOMAS BY AJCC STAGE (n=92)



In the interest of determining whether proper treatment guidelines are followed, we examined treatment administered for the 61 analytic cases with stage I papillary carcinoma. According to the seventh edition AJCC Staging Manual, stage I disease would be the stage for any patient under 45 with no metastasis or anyone over 45 with no regional lymph nodal involvement or distant metastasis.

TREATMENT ANALYSIS

Surgical treatment

NCCN guidelines state that for AJCC stage I papillary carcinoma, the primary treatment is either thyroidectomy or unilateral lobectomy with removal of isthmus.

Sixty of the 61 cases received thyroid surgery. The patient who did not receive surgical treatment was pregnant, and recommended surgical treatment was delayed for the full pregnancy term. A follow-up call with the otolaryngologist revealed that the patient chose not to pursue conventional treatment of any kind for this cancer.

Thyroid hormone suppression of thyroid-stimulating hormone (TSH)

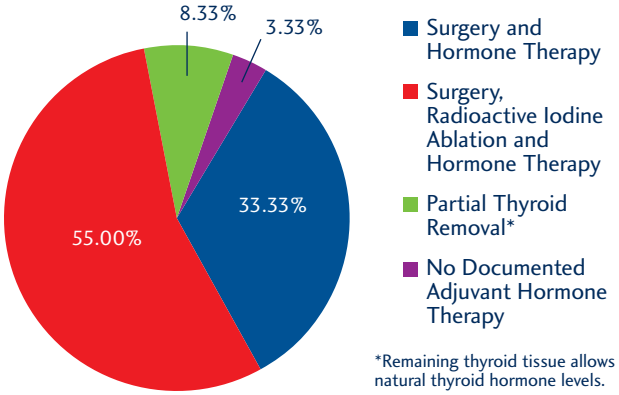
The use of levothyroxine for thyroid hormone suppression is another adjuvant treatment for papillary carcinoma of the thyroid. The levothyroxine administered to cause this thyroid hormone suppression decreases TSH levels, which in turn causes a slowed cell growth of thyroid follicular epithelial cells. Since optimum serum levels for TSH have never been fully determined, the NCCN panel cautions against the excessive use of levothyroxine and recommends it be tailored to each patient's risk of recurrence or progression of disease. Regular monitoring of TSH levels needs to occur to prevent toxicities with associated symptoms of heart tachyarrhythmia, bone demineralization and thyrotoxicosis.

Fifty-three of our 60 stage I papillary carcinoma thyroid cancer surgical cases received adjuvant hormone therapy as a first course of treatment. And five of the seven who did not have documentation of hormone treatment had only partial thyroid removal, so the remaining thyroid tissue allowed for adequate maintenance of natural TSH levels that did not require hormone treatment. The remaining two cases went to other unknown facilities; therefore, follow-up for further hormone treatment could not be assessed. Twenty of those 60 cases had surgery and hormone therapy only for treatment as stated above, and 33 of the 60 had surgery, radioactive iodine ablation and hormone therapy as treatments. It is suspected the remaining two

continues

with no record of hormone therapy did have this, because total thyroidectomies were performed on those patients. (See Figure 4.)

FIG. 4: TREATMENT DISTRIBUTION FOR STAGE I PAPILLARY CARCINOMA OF THE THYROID (n=60)



Radioactive iodine treatments

NCCN guidelines do not recommend radioactive iodine ablation for all thyroid cases. It is most recommended for:

- Ablation of thyroid remnant, which may aid in detection of recurrent disease
- Adjuvant therapy to treat suspected micrometastasis
- Treatment of known persistent disease

Radioactive iodine (I-131) is not recommended by NCCN for papillary microcarcinomas, even where there is multi-focality of the microcarcinomas. There were 10 cases that had papillary microcarcinomas. Of those 10 cases, one received radioactive iodine treatments, but this case also had a synchronous Hürthle cell carcinoma thyroid primary.

There is some debate about the efficacy of radioactive iodine (I-131). In fact, guidelines suggest not using it in low-risk patients. Some trials have shown treatment leads to other cancers as well. The NCCN panel is divided on when this treatment should or should not be utilized. Lower doses have been shown to have equal effectiveness as higher doses. Studies have also shown mixed data regarding whether this treatment adds to overall survival outcomes.

There were 35 patients who met the criteria listed above and did receive radioactive iodine ablation.

CLINICAL ANALYSIS AND SUMMARY

As stated, surgery is the mainstay of treatment per NCCN guidelines for stage I thyroid cancer, and surgery was either performed or recommended for all 61 stage I cases. Thyroid hormone suppression was administered per NCCN guidelines for all applicable cases, excluding one due to patient preference and two cases with lost contact who most likely received their treatment elsewhere. Radioactive iodine ablation was administered per NCCN treatment guidelines only for treatment of known persistent disease, used adjuvantly to treat suspected micrometastasis and to ablate thyroid remnant to aid in recurrent disease detection. Traditionally our organization took an aggressive, proactive approach, and for 56 of the 61 AJCC stage I cases, we provided a documented multimodality of treatment for a notable 92 percent of our study population.

CLINICAL-BASED QUALITY IMPROVEMENT RECOMMENDATION

As is commonplace with many other malignancies, the presentation of all new cancer cases in a multidisciplinary review forum has become the accepted standard for providing truly comprehensive and exemplary cancer care. At present, our institution does have a monthly tumor conference, which is routinely attended by members of Endocrine, Endocrine Surgery, Otolaryngology, Pathology and Radiology. Analysis of our retrospective data could illuminate how frequently this opportunity is being utilized in planning a truly comprehensive approach to thyroid cancer cases within our institution. Should this analysis demonstrate a paucity of cases being brought before rigorous peer review prior to therapeutic interventions are undertaken, an opportunity may be seized to increase the utilization of this tumor board. Further, should an underutilization be discovered, this fact might spurn the expansion of the tumor board schedule to a more frequent biweekly format.

SOURCES

- *2012 American Cancer Society - Facts and Figures*
- *AJCC Cancer Staging Manual,* Seventh edition
- *NCCN Clinical Practice Guidelines in Oncology* (NCCN Guidelines) v 2.2013, Thyroid Carcinoma
- *Revised American Thyroid Association Management Guidelines for Patients with Thyroid Nodules and Differentiated Thyroid Cancer* - The American Thyroid Association (ATA), 2009
- *Thyroid Cancer Detailed Guide,* American Cancer Society, 2012

National Cancer Institute Designation

Central to The University of Kansas Cancer Center's vision to eliminate cancer in our region and beyond was achieving National Cancer Institute, or NCI, designation in June 2012. NCI designation signifies that our academic cancer center has attained the highest standards and that promising cancer research, leading to improved care and treatment, takes place in our community.

The NCI accreditation process

NCI designation is the highest recognition for an academic cancer center. It opens doors to additional research funding, provides related economic benefits and jobs to the community and brings the most advanced cancer care to patients.

With NCI designation, our region realizes a new level of excellence as a bioscience research center. It provides us the opportunity to more fully leverage research investments made by the University of Kansas and the Stowers Institute for Medical Research.

In addition, NCI designation drives growth across many related segments of the regional economy. Approximately 1,200 employees, including faculty, research support, clinical and administrative staff, are dedicated to cancer clinical care and research activities. We estimate that from 2006 to 2011, our pursuit of NCI designation created 1,014 regional jobs and had a regional economic impact of $346 million. By 2016, we estimate the number of jobs created will reach 2,559 and the regional economic impact of NCI investments will total $2.02 billion.

No other regional initiative has as much potential to simultaneously drive economic development and public health.

How patients benefit from NCI designation

Most importantly, NCI designation means patients in our region do not have to travel far to find the most advanced care and clinical trials. These resources are available close to home.

NCI-designated Cancer Centers recruit top physician-scientists. Patients receive the latest evidence-based treatments. Patients who are unresponsive to standardized treatments may have additional options provided through NCI Cancer Center-sponsored trials. Our patients receive access to the same promising therapies offered in clinical trials at other top NCI Cancer Centers.

Becoming the 67th NCI-designated Center is a milestone in our journey to ultimately eliminate cancer.

Cancer Patient Support Services

Nurse navigation services

Our nurse navigators guide patients from their first call through their treatment process and follow-up. They answer questions and offer emotional support every step of the way. Nurse navigators make sure patients are prepared to meet with specialists and their cancer care team by collecting medical records, getting orders for tests when needed and identifying support services for patients and their caregivers.

Social services

Our social workers assist patients in both inpatient and outpatient settings. In addition to helping patients and their loved-ones cope with distress related to their cancer diagnosis and treatment, our social workers provide resources for lodging, transportation, home care services and financial concerns including medication assistance programs. They also provide information on Social Security disability and Medicaid and make referrals to community resources that offer numerous classes and programs.

Psycho-oncology services

Our licensed psychologists provide patients and their caregivers support for the mental, emotional and behavioral aspects of the cancer experience. They provide assessment, consultation and evidence-based therapeutic interventions and counseling for individuals, groups, families and couples. They also help patients adjust to the lifestyle and behavior changes that accompany cancer diagnosis, treatment and survivorship. Short-term crisis resolution and grief counseling for caregivers and family members are also available.

Nutrition services

Our dietitians provide individualized nutrition care to patients and work with caregivers in helping patients achieve optimal nutrition at home. Our dietitians work closely with each patient's healthcare team to provide comprehensive care, with the goal of keeping patients strong, maintaining muscle mass, promoting healing, treating nutritional deficiencies and minimizing complications and side effects of cancer. Ultimately, the dietitian's goal is to promote overall better quality of life before, during and after cancer diagnosis and treatment through good nutrition.

Spiritual services

We offer pastoral care/spiritual services for our patients and hospital visitors to help them meet their spiritual needs. Members of our spiritual care team are available on request to everyone. All of our spiritual care teams are ordained ministers and able to offer prayer, pastoral counseling and worship services.

Financial counseling services

Our financial counselors help patients navigate the cancer journey by understanding the costs of cancer and insurance implications, and the complex application process for Medicaid and other financial assistance programs. They also assist patients in securing financial benefits from these programs and from private health insurance. The Patients in Need Fund at Missys' Boutique at our Westwood campus helps uninsured and underinsured patients receive the boutique's cancer-related services and products at no charge.

Educational resource services

Our patient resource centers provide answers, resources and support for cancer patients, their families and the community. Staffed by an experienced oncology nurse, each center offers information about specific types of cancer, treatments, clinical trials and other cancer-related issues. A variety of cancer-related programs and educational classes are offered throughout the community as well. Others are available through televideo.

Practical and emotional support groups

Our staff facilitates support groups and educational programs for patients and families affected by gynecologic, breast, renal cell, head and neck, prostate and other cancers, along with groups for caregivers. Patients and families also receive information about community cancer support groups and agencies that provide practical and emotional support.

Turning Point: The Center for Hope and Healing in south Kansas City, a program of The University of Kansas Hospital, provides educational programs at different locations throughout the greater Kansas City area at no charge. Topics include mind/body, movement, nutrition, art and more for all patients with chronic illnesses. They also offer programs for children of all ages and their family members.

Onco-rehabilitation services

Our onco-rehabilitation physiatrist works with cancer patients and caregivers in inpatient and outpatient settings to help them maintain and improve their functional abilities, alleviate pain, minimize fatigue and improve quality of life. Occupational therapists focus on helping patients with activities of daily living, and speech pathologists help patients who have difficulty with communication, cognition or swallowing.

Personal appearance services

Missys' Boutique, located at our Westwood campus, is an accredited appearance center dedicated to helping patients overcome appearance obstacles with dignity and style. Services include bra and wig fittings. Products include breast forms, postsurgery bras and camisoles and a wide assortment of clothing and accessories.

Survivorship services

Surviving cancer begins the day of diagnosis and continues every day after. Survivorship services include:

- Providing patients with treatment summaries
- Providing ongoing care of survivors and their caregivers
- Scheduling follow-up appointments
- Referring patients to appropriate support services to address late effects such as energy balance or cognitive concerns

Fertility preservation services

Cancer treatments result in fertility challenges following treatment. We provide fertility preservation services in which eggs and sperm are harvested from the body, preserved through freezing and transplanted back after treatment. Samuel Kim, MD, the program director, is recognized worldwide for his cryopreservation and transplantation work.

Palliative care

Palliative care focuses on how well patients with a terminal illness can live better every day. We provide for the medical, emotional and spiritual needs of patients of all ages with illnesses at any stage. Outpatient services are offered through the Allen J. Block Outpatient Palliative Care Program. Our specialty-trained team of physicians, nurses and social workers:

- Provides psychological and spiritual care to patients and families
- Helps patients live each day as well as possible
- Promotes and facilitates patient-centered decisions

Pediatric palliative care includes services provided by KU Kids Healing Place.

Pharmacy patient advocate services

We provide pharmacy patient advocates, or PPAs, who answer patients' questions or concerns, reorder medications and streamline payment processing.

Second opinion services

We offer second opinions to provide patients and referring physicians the opportunity to receive multidisciplinary opinions and the confidence to begin treatment.

National Cancer Institute Cancer Information Service

The NCI Cancer Information Service provides the latest and most accurate information to patients, their families, the public and healthcare professionals. This national information and education network is a free public service of the NCI. Call toll free 800-4-CANCER.

Biospecimen Bank

The Biospecimen Bank at The University of Kansas Cancer Center supports cancer research by serving as a bank for human tissues and fluids. Researchers use these biospecimens to study causes, prevention, detection, diagnosis and treatment of cancer. Find out how you can make a tissue or fluid donation by calling 855-211-1475.

Glossary of Terms

Accession number: A unique number assigned to each patient entered into The University of Kansas Hospital's Cancer Registry. The first two digits specify the year of diagnosis. The last four numbers are the numeric order in which the case was entered into the database.

Adjusted (observed) survival rate: Whenever reliable information on cause of death is available, an adjustment can be made for deaths due to causes other than the disease under study. Patients who died without disease are treated in the same manner as patients "last seen alive during the year."

AJCC stage: A staging system developed by the American Joint Committee on Cancer and the International Union Against Cancer. It takes into account the tumor size (T) and/or depth of invasion, lymph node involvement (N) and distant metastases (M). A combination of T, N and M elements gives an overall classification of Stage 0, I, II, III, IV or unknown stage.

Analytic case: A case that is first diagnosed and/or receives all or part of the first course of treatment at The University of Kansas Hospital.

Distant: A malignant neoplasm that has spread to parts of the body remote from the primary tumor either by direct extension or by discontinuous metastasis to other organs, tissues or lymph nodes.

In situ: A neoplasm that fulfills all microscopic criteria for malignancy without invasion.

Localized: A locally staged neoplasm that is restricted to the organ of origin.

Nonanalytic case: A case that was diagnosed elsewhere and received the entire first course of treatment at another institution, presenting here for recurrence or progression of disease.

Regional: A neoplasm that has spread by direct extension to immediately adjacent organs or tissues and/or regional lymph nodes.

Systemic: A neoplasm that is disseminated throughout the body or found in blood and/or bone marrow.

Unknown: A neoplasm whose stage cannot be determined by a medical authority or indeterminate stage from the medical record.

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