Cancer Services Annual Report 2014

Glendale Adventist Medical Center
Cancer Services
Adventist Health

2014 Cancer Services Annual Report

Including 2012 Cancer Registry Data

Welcome to the 2014 Cancer Services Annual Report

Kevin A. Roberts, RN, President & CEO, Glendale Adventist Medical Center

In last year's annual report, I shared my pride in our Cancer Services program receiving The Outstanding Achievement Award from the American College of Surgeons. This prestigious honor recognized a very select number of comprehensive programs that provided the highest quality care to cancer patients.

Just recently, Glendale Adventist was named *Top Performer on Key Quality Measures®* by The Joint Commission for attaining and sustaining excellence in accountability measure performance. Fewer than 1,100 hospitals throughout the country earned this impressive distinction.

While these awards represent a tremendous source of pride and are a tribute to our hospital, we are not resting on our achievements. Our cancer program, in particular, continues to improve and earn commendations for achieving the highest standards of patient care. We are continuing to integrate the latest technology available to all cancer patients, including a state-of-the-art CT scanner and planning for a new linear accelerator (LINAC). And, in partnership with our hospital's other service lines, Cancer Services is working toward broadening our community outreach so that every patient diagnosed with cancer has access to the high quality programs offered at Glendale Adventist Medical Center.

Highest standards and leadership

Since 1976, Glendale Adventist has received approval from the American College of Surgeons as a Comprehensive Community Cancer Program. During this time, Cancer Services has earned numerous accreditations with commendations and, only two physicians – **John Gunnell,** MD, and **Boris Bagdasarian,** DO – have served as Cancer Program chairmen. Their dedication and longevity are truly admirable and on behalf of the entire hospital, I express my gratitude for their leadership.

Our cancer program also has tremendous support from several physicians, including **Sam Carvajal,** MD, cancer liaison physician for the past two terms; **Sara Kim,** MD, medical director of Radiation Therapy, who has assisted with compliance of the ACOS standards from the Quality Control of Abstracts, CME program and volunteers at prostate screenings; **Linh Chen,** MD, for her contributions each month to the Breast Tumor Board; **Michele Cosgrove,** MD, for her studies with CP3R and CAP audits; and **Sze-Ching Lee,** MD, who spearheads our community prostate screening each September.

Cancer Center Outpatient Infusion Center, coordinated by **Allen Molina,** RN, OCN, and infusion nurse **Marion Shannon,** RN, OCN, are oncology certified, an important designation that represents advanced training and experience. They work closely with patients throughout their chemotherapy treatment, also serving as "educators" and a devoted support team. Glendale Adventist is one of few area hospitals with an inpatient unit exclusively for the care of cancer patients. **Agnes Pagdilao,** RN, OCN, and her team are of the highest quality offering bedside and end-of-life care, in collaboration with the hospital's new inpatient hospice program.

My praises would not be complete without applauding the leadership of **Melina Thorpe,** RN, OCN, and the cancer registry staff – **Denise Cleveland,** RHIT, CTR; **Kathie Morgan,** CTR; and **Anita Theis** — whose direction of this exemplary program is reflected in continued accreditation with commendations. **Cynthia Klinger,** MFT, is widely respected in this community and coordinates Cancer Support and Brain Tumor Support Groups, while also offering patients and family members individual counseling services. Nurse Navigator **Sharon Feinberg,** RN, OCN, provides expert guidance for patients through oncology care. The compassion and care these professionals in Cancer Services offer our patients is unequaled throughout the hospital.

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Patient support through community outreach

We are grateful to the Dr. Norick Bogossian Cancer Care Guild and their leadership, including President **Ramella Markarian** and Guild Manager **Hilda Bogossian,** for presenting Laugh for a Cause, the Courage Award luncheon and other top-notch events that raise funds for an extensive array of classes and programs available free of charge to anyone with a cancer diagnosis. We are also pleased to welcome Healthcare Foundation President **Irene Bourdon,** whose experience in hospital philanthropy and strategic development is benefiting Cancer Services and all of GAMC's service lines.

An important component supporting GAMC cancer patients is the fitness program available at the hospital's off-campus Therapy and Wellness Center, part of a suite of outpatient services offered by Physical Medicine and Rehabilitation. Recovering from cancer takes a multi-faceted approach, and we are especially proud of this program.

"A sacred trust and privilege"

Every member of our Cancer Services team considers it a sacred trust and privilege to be part of the lives of those who come to Glendale Adventist to seek treatment. I have heard many times of our team members speaking of the courage, faith and authenticity of the patients they serve. I am honored to serve as a colleague as we progress toward making Glendale Adventist your world-class hospital.

Cancer Committee Chairman's Message

Boris Bagdasarian, DO, Hematology and Oncology, Chairman, Cancer Committee

The mission of Glendale Adventist Medical Center's cancer program is to provide the highest quality comprehensive cancer care for the patients in our community. We have worked hard to promote common interests of the nation's leading academic and free-standing cancer centers that are focused on the eradication of cancer through a comprehensive and multi-disciplinary approach. Our center of attention is based on strategic initiatives of service, evidence-based care and patient safety. The American College of Surgeons Commission on Cancer accreditation of GAMC and as the recipient of the Outstanding Achievement Award, only given to top cancer programs in the country, testifies to the dedication of the cancer committee members, hospital and medical staff. This acknowledgment places our comprehensive community-based cancer program on a pedestal, not only among the very best in Los Angeles County, but throughout the state and nation.

Multi-disciplinary tumor boards are held to review prospective cases. In this forum, physicians and support staff are given an opportunity to discuss newly diagnosed cancer patients in a collegial and consultative setting. We discuss the patient's case thoroughly and form a consensus and recommendation regarding the best therapeutic management of our patients. Our cancer program continues to grow and provide patients with the latest cancer care throughout our region and beyond. It is a time of opportunity, a time to join in guiding and accelerating our knowledge of cancer treatment and prevention. Complementing the medical components of the cancer program is a full-spectrum of ancillary services. Our highly trained oncology certified nurses, dieticians, psychologists, physical and occupational therapists dedicate themselves to provide compassionate care in a healing environment.

We are exceedingly proud of our cancer program and we are inspired on a daily basis by the courage of our patients and the trust they have placed in us. Through the continued efforts of our physicians and staff, we strive to make our community-based cancer program one of the best in the nation.

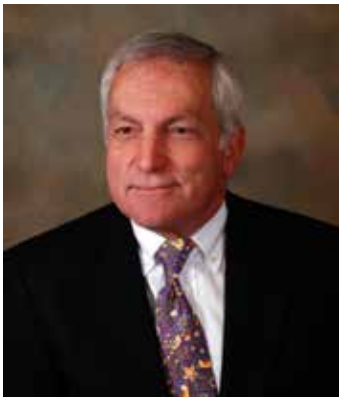
Back row (from left) Suzanna Tamazyan, RN; Mark Schlesinger, MD; Sharon Feinberg, RN, OCN; Michele Cosgrove, MD; Sze Ching Lee, MD; Sam Carvajal, MD; Boris Bagdasarian, DO; Kelly Turner, Senior VP; Sara H. Kim, MD; Al Garcilazo; Denise Cleveland, RHIT, CTR.

Front row (from left) Chrissy Kim, American Cancer Society; Allen Molina, RN, OCN; Karine Arakelyan; Hilda Bogossian; Marion Watson; Tracey Sanders; Melina Thorpe, RN, OCN; Lily Villalobos; Arlene Matsuda, LCSW; Kathie Morgan, CTR.

Not pictured: Emillie Battig, RN; Wende Brookshire; Linh Chen, MD; Alina DerSarkissian; Kamyar Ebrahimi, MD; Val Emery; Julie Ji, RD; Cynthia Klinger, MFT; Ramella Markarian, Associate VP.

Pain Management Makes a World of Difference

Mark P. Schlesinger, MD, Pain Management, Anesthesiology



It was a lovely afternoon in May of 1979, when I took the oath of my profession during my graduation from the Columbia University College of Physicians and Surgeons. Impressed by those words, what struck me most as I read the Hippocratic Oath and the Oath of Maimonides, and what amazes me still, is that I never promised to cure anyone, but merely to ease the journey of the less fortunate along the road that we must all follow.

You see, I treat cancer, but not in the way you might at first imagine. I do not cut it out or seek to poison it with carefully selected regimens of increasingly complex drugs. In fact, I never cure anyone. My specialty is the management of chronic pain and, for the most part, I meet my cancer patients after the hope of cure has become distant or non-existent. I know my patients for a relatively short time — six months, a year, in luckier cases, for two or three, but rarely more than that. I meet them after medications, patches or injections have either ceased to work or have begun to cause side effects as intolerable as the pain itself.

In a few cases, I can bring relief by incapacitating or destroying a single nerve, but usually, the pain is more widely spread and my tool of choice is an intrathecal drug delivery system, commonly known as a spinal pain pump. With this device, I am able to deliver pain-relieving medication directly into the spinal fluid, in the area of the spine, mediating a majority of the pain signals.

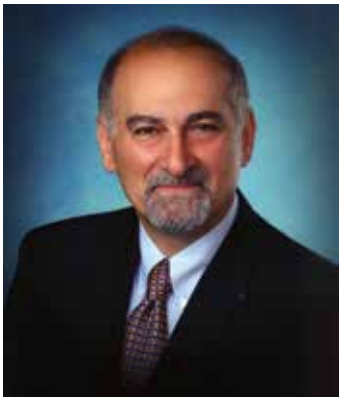
When administered this way, commonplace drugs, such as morphine, become between 100 and 1000 times more potent, but without a concomitant increase in side effects. I find that I am often able to significantly reduce the patient's pain and eliminate the side effects. Patients who were bedridden begin to walk. Shut-ins resume a semblance of their normal social lives. People who have been disabled by pain sometimes return to work. Appetites improve and, for a time, the wasting effects of the cancer are slowed or reversed. In every case, life takes on an air of joy that was sadly missing.

The insertion of one of these pain pumps, while technically simple, is not a trivial matter. It involves a small operation, comparable in severity to the insertion of a cardiac pacemaker, and in all cases is preceded by the placement of a temporary trial catheter to ensure the technique will work adequately. Presently, there are three different models available in the United States, but at Glendale Adventist we use only the Medtronic Synchromed II, because I find it to be superior both in efficacy and safety. I have been told by the engineers at Medtronic that a new model is due within the next year or two, depending on the speed with which the FDA acts. The model will have improved accuracy and programmability, but will not extend the therapeutic range of the device.

People sometimes ask me if I find working with incurable cancer patients depressing. My response is always that it is, by far, the most rewarding part of my practice. I have always felt that quality is more important than quantity. I have a collection of particularly bad jokes that I reserve for these patients and I gauge my success by their reaction to these jokes — and by the ones I get in response.

Surgical Aspects of Stomach Cancer and Prevalence in an Armenian Community

Simon Keushkerian, MD, General/Vascular Surgery



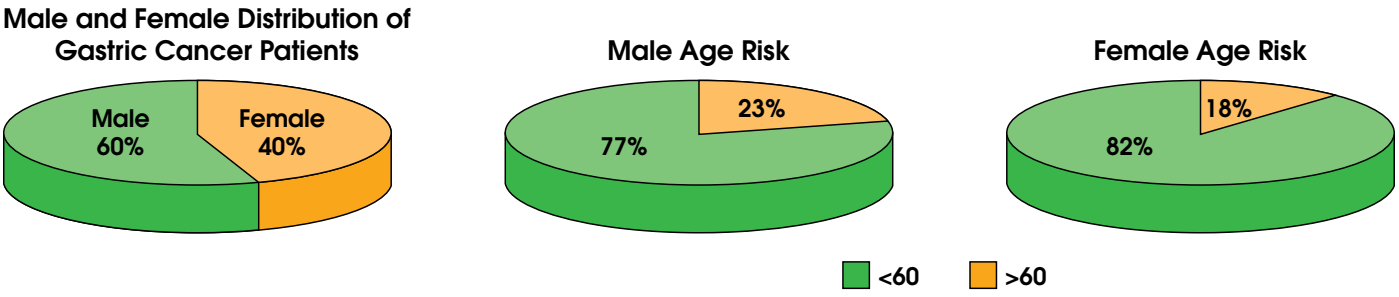
GAMC's cancer registry stores all information regarding cancer patients who had any encounter with their disease at GAMC. Information regarding age, race, ethnic identification, demographics and outcome were reviewed from 2003-2012. A total of 190 patients were included in our review, which ranged from ages 32-105 years. A particular interest was paid to the prevalence of gastric cancer in the Armenian community residing in Glendale, California.

Background

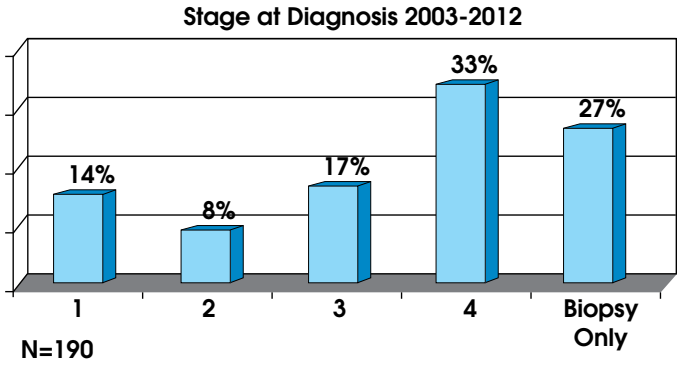
Gastric cancer, once the second most common cancer in the world, has declined drastically in the past 50 years in developing countries. This can be attributed, in part, to better storage of food, such as the refrigerator, as well as decreased intake of salt and carcinogenic compounds. Additionally, new treatments for *H. pylori* have also decreased the incidence of the disease. Despite this information, gastric cancer remains the second most common cause of cancer related death in the world.

Stomach cancer is classified based upon the relationship to the long axis of the stomach. About 40% of cancers develop in the lower stomach, 40% in the middle of the stomach and only 15% in the upper part. Throughout the world, incidence and location vary based on genetics, diet, and a variety of other factors. Rates of the disease are at their peak in Asia, while they are lowest in North America. The highest death rates of gastric cancer occur in Chile, Japan, South America and the former Soviet Union.

Gastric cancer occurs twice as often in men than in women. Of the 190 patients at GAMC, 60% of the patients diagnosed were male. Furthermore, we found a correlation between male diagnoses at an earlier age.



Overall, the 5-year survival rate ranges depending on treatment type and staging. With surgical treatment this can vary from 30-50% for Stage 2 cancer, to 10-25% for Stage 3 cancer. Additionally, race seems to play a role in mortality as Asian and South American countries have a lower mortality than the US, Japan and Chile despite the same treatment and staging. Genetically, patients in the US, Asia and the Pacific Islands have the highest incidence of stomach cancer.



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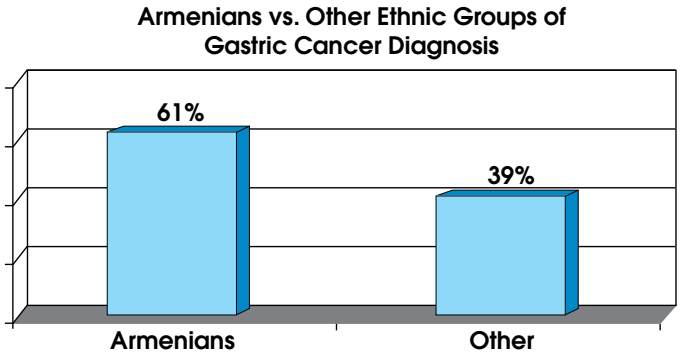
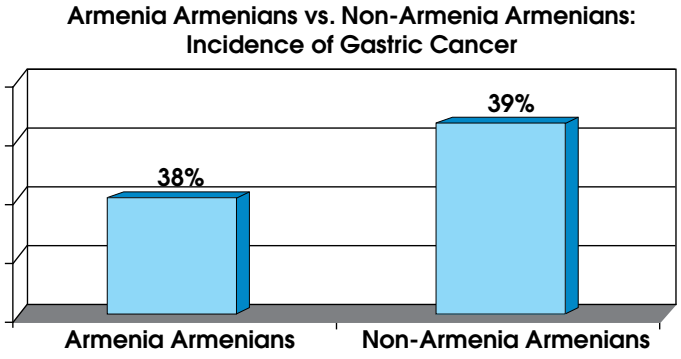
The causes of gastric cancer are often multi-factorial. As such, a variety of environmental factors play a role in the cancer's development, including *H. pylori*, diet, previous gastric surgery, pernicious anemia, polyps, chronic gastritis and radiation. Also, smoking has been shown to increase the incidence of disease roughly 1.5 fold.

Incidence in the Ethnic Community

Glendale Adventist Medical Center has a high percentage of Armenian immigrants who come from different parts of the world. A comparison was made between Armenians and non-Armenians diagnosed with gastric cancer. Statistically, Armenians comprise of 61% of all gastric cancer diagnoses at GAMC.

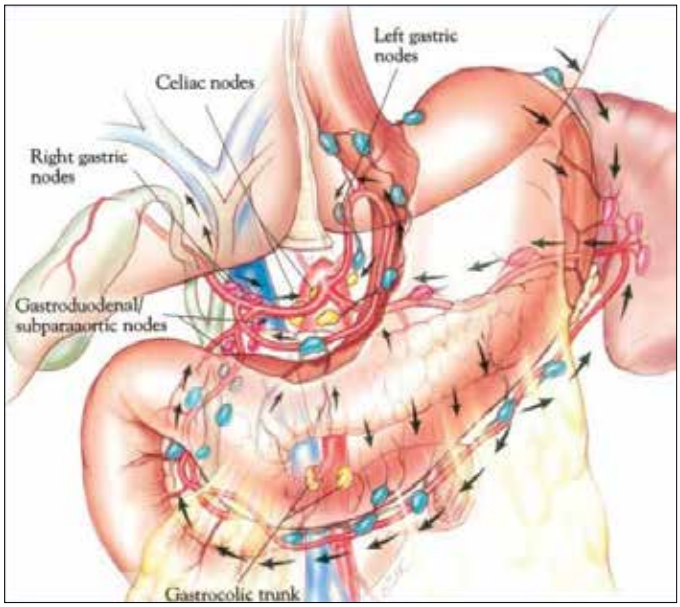


Furthermore, within the subgroup of Armenians, those immigrating from Armenia had a lower rate of gastric cancer in comparison to Armenians who were immigrants from Middle Eastern countries other than Armenia.



Pathophysiology

There are three oncogenic pathways, which are altered in the majority of gastric cancer. These pathways include NF- κB, Wnt/ß-cantenin and proliferation/stem cell pathways. These pathways can play an important role in patient outcomes. Additionally, understanding the vascular supply of the stomach can give insight into the routes of hematogenous spread. The lymphatic drainage should also be understood to clarify the risk for nodal involvement. Primary drainage is along the celiac axis, while lesser drainage occurs via the splenic hilum, suprapancreatic nodes, porta hepatis and gastroduodenal areas.



Clinical Presentation

In the United States, only 25% of stomach cancer patients present with localized disease, 30% with regional disease and 30% with distant metastatic disease. This is often due to the fact that gastric cancer is rarely grossly symptomatic until advanced disease. Common complaints include indigestion, nausea and vomiting, dysphagia, fullness, loss of appetite and weight loss. Later, complications such as obstruction, pleural effusion, jaundice and bleeding can occur. Physical signs typically occur later in the disease such as a palpably enlarged stomach, hepatomegaly or lymphatic metastases. These typical lymphatic metastases include periumbilical metastasis (Sister Mary Joseph), Virchow nodes (supraclavicular) and Irish nodes (axillary). Additionally, signs such as dermatomyositis, acanthosis nigricans and other paraneoplastic syndromes can indicate a poorer prognosis.

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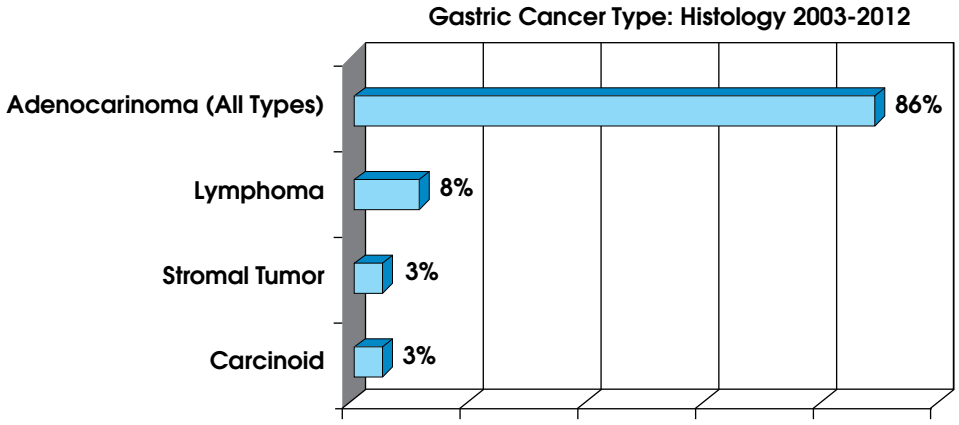
Histology

Histologically, adenocarcinoma is by far the most common of malignancies accounting for 90 to 95% of all gastric cancers. Other types of gastric cancer include lymphomas, stromal tumors, squamous cell carcinomas and carcinoids.

In the past 10 years at GAMC, 86% of gastric cancers were adenocarcinomas, 8% lymphomas, 3% gastrointestinal stromal tumors and 3% carcinoids. When comparing this new data versus the previous decade, we found that there was not a significant change in the type of gastric cancer.

Adenocarcinoma can be further differentiated into tubular, papillary, mucinous or signet-ring cells.



Work-Up

Work-up for diagnosis and staging of gastric cancer should involve laboratory studies, imaging, and histologic findings. Lab studies can help determine the appropriate therapy, including CBC, to rule out anemia and electrolyte panels to characterize the patient's current health status. Furthermore, markers such as CEA and CA 19-9 have been found to be elevated in cases of gastric cancer.

When imaging for diagnosis, EGD has a diagnostic accuracy of 95%. During the procedure, a biopsy of the ulcerated lesion can be performed including six specimens taken from around the ulceration. This is important in order to account for variable transformation of the malignant tissue. Other modalities include double-contrast upper GI series and barium swallows to assess obstructive symptoms or protrusions into the normal bowel pattern. These are less accurate than EGD and should only be used when endoscopy is not feasible. Radiographic modalities including CT and MRI can be used to assess local disease, as well as evaluate areas of metastatic spread, including lymph nodes and other intra abdominal segments. CXR should be performed in order to look for metastases..

Surgical Treatments

If the disease is caught prior to dissemination, aggressive surgical resection remains the main curative therapy. In general, the surgery involves a wide resection able to achieve negative margins as well as en bloc resection of lymph nodes and any adherent organs. The specific type of resection depends on location, stage and pattern of spread.

Proximal Tumors

In general, these tumors are more advanced at presentation. As a result, it is often more difficult to obtain a curative resection. There are three types of tumors found at the GE-junction. Type I is associated with Barrett's esophagus or esophageal carcinoma growing into the GE junction. Type II is a tumor within 2cm of the squamocolumnar junction. Type III are tumors found in the subcardium. Type I tumors should undergo a gastric pull-up to the neck or an Ivor-Lewis type esophagogastrectomy. Patients with type II or III can be resected with a total or subtotal gastrectomy. Typically, a total gastrectomy is preferred due to less reflux esophagitis and easier removal of the lymph nodes along the lesser curvature.

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Mid-body Tumors

Generally, since resection would leave very little remaining stomach, a total gastrectomy is required.

Distal Tumors

Studies have found no survival advantage to performing a total gastrectomy versus a distal subtotal gastrectomy. Typically, quality of life after subtotal gastrectomy remains superior to total gastrectomy and should be performed if adequate margins can be achieved. In general, 5cm to 6cm margins are recommended.

Endoscopic Mucosal Resection (EMR)

In early cancers, alternative surgical approaches can be considered. Early mucosal cancers can be removed through an endoscope similar to a colonic adenoma polypectomy. Very early-localized tumors (T1 Borrmann's Type 1, Type IIa and IIb) tend to be entirely confined to the mucosa, leaving them with little chance of nodal involvement. After the procedure, the specimen must be carefully examined with serial sectioning to ensure there is no submucosal involvement.

Lymphadenectomy

The amount of lymph nodes that should ideally be removed remains a controversial topic in the management of gastric cancer. Retrospective studies show that extended lymph node dissection can improve 5-year survival in Stage II or III disease, however, most western surgeons believe that lymph node metastases are indicative of systemic metastases. As such, they believe that radical lymphadenectomy will rarely improve overall outcome.

Extent of dissection is designated by a "D." D1 is a dissection including only perigastric lymph nodes, D2 would also include hepatic, left gastric, celiac, and splenic lymph nodes. If a dissection includes the nodes along the porta hepatis, retropancreatic and periaortic regions, they are called D3 resections. Typically, Japanese surgeons advocate for D2 resection with all standard cancers. The western guidelines indicate that the resection be one level higher than known lymph node involvement. A number of trials have been performed with varying results comparing Dl and D2 resections and their associated mortalities and recurrence. Recent non-randomized trials in the U.S. have achieved increased survival without increased morbidity and mortality with D2 resections, as suggested by Japanese studies.

After Resection

Reconstruction can be performed after subtotal gastrectomy, including a gastroduodenostomy, an antecolic or retrocolic gastrojejunostomy, or an antecolic or retrocolic Roux-en-Y gastrojejunostomy. Roux-en-Y is relatively simple to construct with a greater likelihood for an anastomosis that remains tension free. It also avoids bile reflux associated with gastrojejunostomy.

After total gastrectomy, reconstruction can consist of a Roux-en-Y esophagojejunostomy, construction of a pouch, or jejunal interposition. There is no true recommendation on which reconstruction is the best; however, Roux-en-Y is simpler to construct and is widely considered to have decreased mortality.

Intraperitoneal Therapy

While mitomycin trials were initially promising, recent trials have failed to show benefit. Intraperitoneal therapy is not recommended at this time for adjuvant treatment.

Management of Advanced Disease

Surgical palliation may be appropriate due to the low rate of cure for gastric cancer, particularly in advanced disease. This can include resection or a combination with other therapeutic interventions. Generally, patients with peritoneal, hepatic, or nodal mets will most likely benefit from endoscopic palliation including recanalization, dilation and stent placement. In very rare instances, better prognosis cases can be cared for via surgical resection. Furthermore, palliative chemotherapy should be considered for most patients.

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Cancer Care Guild 2013 In Review

Ramella Markarian, AVP, Business Development, & Cancer Care Guild President 2013

The Dr. Norick Bogossian Cancer Care Guild was established in May 2011 to benefit and expand services at GAMC's Cancer Center, which provides free support services at GAMC to anyone with a diagnosis of cancer. Services include personal and family counseling, support groups, fitness programs such as yoga, classes in jewelry making, knitting, creative writing, and a positive image center that provides free wigs, hats, and scarves to patients.

The Guild was named in memory of the late Dr. Norick Bogossian, a renowned plastic surgeon who specialized in cancer-related reconstructive surgery. The Guild raises funds by presenting a variety of events throughout the year, including the comedy night "Laugh for a Cause," attended by more than 1,000 people at the Alex Theatre in Glendale.

In November 2013, the Guild hosted the annual Courage Award luncheon, which celebrated four cancer survivors from the community in a memorable and joyous manner. The recipients were Dave Weaver, Mayor, City of Glendale; Ella Boghossian, event planner; Diane Russell, active community volunteer and wife of the late State Senator Newton Russell; and Daniel R. Voge, attorney.

Since its inception, the Cancer Care Guild has raised more than $182,000 to support the GAMC Cancer Center's free programs for patients.

Our phenomenal group of volunteers is comprised of dedicated, caring and compassionate individuals, who go above and beyond to make all of our events successful. The free support services provided by the award winning Cancer Center are made possible through the generous support of our donors and dedicated volunteers. We are looking forward to many more years of service for Glendale Adventist Medical Center.

The Cancer Care Guild welcomes Tina Parsegian, President for 2014.

Members and friends of the Glendale Adventist Cancer Care Guild.

Survivorship

Cynthia Klinger, MFT, Cancer Services

Support groups are an integral part of GAMC's Survivorship Program. Studies have clearly shown there is improved quality of life for cancer survivors who participate in support groups. Cancer is not only an attack on the body; it affects the mind and spirit of the survivors, as well as their families. The best treatment plan for cancer patients consists of healing the mind, body and spirit. This encompasses the whole person and includes the family. GAMC Cancer Services is unique in that services are offered to all cancer survivors and their families at no charge, regardless of where they are being diagnosed or treated.

Once a cancer diagnosis is given, life moves quickly. There isn't time to process the overwhelming emotional impact. It is all a patient can do to keep putting one foot in front of the other, as they try to self-navigate the cancer journey without a compass. They find themselves facing a life-threatening illness without the confidence and knowledge that comes from experience. Patients who previously consulted only a primary care physician and were rarely sick, now have multiple doctors and are immersed in an accelerated educational process on their cancer and treatment. Scans, second opinions, surgeries, chemotherapy and radiation treatments cause stress, anxiety and often depression and a sense of isolation and powerlessness.

Support groups connect newly diagnosed patients with survivors who have "been there." Those with first-hand experience can comfort and normalize anxiety, fear, anger and sadness in a way that others, including loved ones cannot. Survivors become guides for the newly diagnosed. They "get it." Survivors can cry with each other and celebrate successes from a deep place of knowing.

Cancer support groups provide a safe place to express all feelings without holding back the things that might worry an already over-burdened family member or friend. The bond between group members makes the individual feel stronger. Studies show that those people who participate in cancer support groups have enhanced self-esteem, reduced distress, less anxiety and depression, more knowledge about their illness and improved relationships with their families.

Cancer is a life changing diagnosis. Cancer patients find themselves on a road they did not ever want to travel, undergoing anxiety-provoking treatment and medical procedures they know little about. Support groups bring unexpected gifts. Deep friendships are formed as members share their feelings and experiences. Patients in remission find help with survivorship issues, as well as finding a meaning and purpose of cancer in their life by helping other survivors.

Cancer survivors in the Cancer Center's Garden of Hope.

Tracey Sanders, Positive Image Coordinator

Glendale Adventist's Cancer Services program reaches out to Glendale and surrounding communities by hosting and participating in a number of health-related activities as outlined below.

Laugh 4 A Cause – May 5, 2013

This event was hosted by the Dr. Norick Bogossian Cancer Care Guild and featured world-renowned comedians, Maz Jobrani and Vahik Pirhamzei. The fundraiser was held at the Alex Theatre in Glendale, and more than 1,000 people attended. The event raised over $62,000, which is going towards the Guild's support services to patients diagnosed with cancer.

Bras for a Cause – April 20, 2013

This annual Soroptimist International of Glendale sponsored event raised money and awareness for breast cancer. Supported by GAMC's Cancer Services, a group of cancer patients and survivors submitted an entry for Bras for a Cause "Celebrates a Decade of Giving" and attended the fundraiser dinner where they received the *Best Depiction of Theme award*.

Cancer Survivors Day – June 24, 2013

Cancer Survivors Day is an annual free luncheon to celebrate the life of cancer survivors and remember those who lost their battle to cancer. *The Time to Celebrate* themed event was attended by over 200 cancer survivors and their caregivers. Debbie Gibson, singer, entertainer and songwriter, was the keynote speaker. She delivered a very inspirational message to all survivors to believe in the power of strength. The Flame of Hope Award was presented to the National Charity League of Glendale and Fran Buchanan for their ongoing support with handmade blankets for patients undergoing cancer treatment and for the generous support of the Cancer Center and Ingeborg's Place Apart, respectively. A special feature of this event included a performance by the canDancers who are members of the cancer survivors dance class. Everyone

Cancer survivors on stage in a celebration of life at the Laugh 4 A Cause fundraising event.

celebrated by dancing in a congo line alongside Debbie Gibson.

Community Skin Cancer Education – June 2013

Cancer Services Director Melina Thorpe and staff participated in a community health fair and educated over 200 attendees on prevention and risks associated with skin cancer.

Prostate Screening – September 19, 2013

A prostate cancer screening was held at the Cancer Center with over 85 participants. Participating physicians were Sze-Ching Lee, MD; Sara Kim, MD; Ben Shenassa, MD; Kamyar Ebrahimi, MD; and Rommel Gonzalez, MD.

Beauty Bus Event – October 10, 2013

A day of pampering and beauty was offered free of charge to cancer patients receiving cancer treatment as well as to their caregivers. The Beauty Bus Foundation sponsored the event with pop–up salon services such as manicures, facials, blow-dry, hair styling and makeup application.

Relay for Life – October 19-20, 2013

Employees, cancer survivors and patients came together to participate in this yearly event. The theme this year was survivorship and the event raised over $67,000 to help support the fight against cancer.

Glendale Health Festival – November 2, 2013

A prostate screening was held at the Fourth Annual Festival at the Glendale Civic Auditorium. Fifty-six participants were screened for prostate cancer.

Members of the canDancers surround Cancer Center director, Melina Thorpe (third from left) and canDancers coach Arlene Vidor, (center) following performance at the annual Cancer Survivors Day luncheon. Comprised of cancer survivors, the dance troupe performs at various functions.

Dr. Norick Bogossian Cancer Care Guild Courage Award Luncheon – November 14, 2013

A fundraising luncheon was held at the Brandview Connection in Glendale honoring Glendale Mayor Dave Weaver, Honorable Daniel R. Voge, Diane Russell and Ella Boghossian for their strength and courage in battling cancer. Entertainment was provided by internationally acclaimed recording artist Shani Rigsbee and the Cancer Center canDancers.

Christmas Party – December 6, 2013

The annual Christmas Party for the Cancer Center was held in the GAMC Main Auditorium this year and featured wonderful music, food and the opportunity to celebrate the season with staff and fellow patients and survivors. The Cancer Center staff hosted this event, always mindful of the joy of giving and helping our patients at Christmas time and throughout the year.

Gathering at the Courage Award luncheon are, front row from left, Kevin A. Roberts, GAMC President/CEO; Ramella Markarian, AVP, Business Development; Courage awardees Dave Weaver, Diane Russell, Daniel Voge and Ella Boghossian; Hilda Boghossian, Manager, GAMC Auxillary Relations; and Melina Thorpe, Cancer Center Director. Standing in the back row is Boris Bagdasarian, DO, Chairman, Cancer Committee.

She describes her position in a few words – timely, accurate, complete documentation – but Denise Cleveland's responsibilities are much more complex. Denise is a detailed-oriented person, a necessary attribute in everything she does as cancer data manager.

> ***"There is a strong feeling of mission here that I have not felt at other hospitals."***
>
> *– Denise Cleveland, RHIT, CTR*

"Denise's day-to-day actions are helping GAMC achieve world-class status," says **Melina Thorpe,** director of Cancer Services. "She has a calm demeanor and teamwork approach to her work, while being an invaluable resource to the Studer organization as a member of the hospital's measurement team, which is striving for clinical excellence."

Denise describes her main function as "American College of Surgeons (ACOS) Standards Compliance." GAMC has a comprehensive community cancer program accredited by the ACOS with standards that assure quality, multidisciplinary and comprehensive cancer care delivery. One of her tasks is educating Cancer Services staff regarding these standards and assisting with the compliance process, while overseeing and being an active participant of the cancer registry. In the registry, Denise works with Kathie Morgan, CTR who has been supportive of the cancer registry these last 16 years.

Quality control is an integral part of her responsibilities, as organizations throughout the country depend on accurate data for reporting statistics such as types of cancers, treatment regimens and survival rates. She coordinates the prostate annual screenings, the 33-member Cancer Committee and has extensive tumor board experience. Being detail-oriented also helps her as secretary-treasurer of the Southern California Cancer Registry Association.

Denise joined GAMC's Cancer Services staff 15 years ago, already having several years of experience in HIM and cancer registry. "There is a strong feeling of mission here that I have not felt at other hospitals," she emphasizes. "We have an excellent team, and I am happy being part of the GAMC family."

Continuing Medical Education 2013

May 1, 2013
Frontiers in Palliative Medicine
Mario Milch, MD, Associate Medical Director Vitas, Healthcare Hospice, Physician Member of the Palliative Medical Association of California.

May 29, 2013
Breast Cancer
Laura Kruper, MD, MSCE, FACS, Director, Cooper Finkel Women's Health Center, City of Hope Cancer Center

July 24, 2013
Colon Cancer Screening for the Primary Care Physician
Ronald Koretz, MD, Emeritus Professor of Clinical Medicine, David Geffen School of Medicine at UCLA

In Pursuit of More Birthdays

Chrissy Kim, American Cancer Society

It was a century ago that the American Cancer Society began the fight of a lifetime—the fight to end cancer. In that time, lifesaving progress has been made that is nothing short of remarkable.

Over 100 years ago the word "cancer" was spoken only in whispers and was an almost certain death sentence. Today, due in large part to society research, prevention and early detection programs, free patient services and advocacy, the overall cancer death rate has dropped 20% since the early 1990s. That translates to more than 400 lives saved each and every day that would have been lost to cancer if not for the progress made against the disease.

As the American Cancer Society celebrates its 100th birthday, it has redoubled its commitment to finding cures as the nation's largest private, not-for-profit investor in cancer research; ensuring people facing cancer have the help they need; and continuing the fight for access to quality health care, lifesaving screenings, clean air and more. Today, two out of three people diagnosed with cancer in the United States survive at least five years. The society's goal is to create a future in which three out of three survive. The society-funded early work of 47 Nobel Prize winners is making that happen.

More than three million volunteers are speaking out, reaching out and taking action to help save lives in Los Angeles, California, across the country and around the world. They drive cancer patients to medical appointments; provide guidance for the newly diagnosed; teach women to combat treatment's cosmetic side effects; enroll in the society's groundbreaking Cancer Prevention Study 3; participate in Relay For Life® and Making Strides Against Breast Cancer®; donate and shop at Discovery Shops; help out in local offices; create fundraising events and much, much more. The American Cancer Society could not accomplish its lifesaving mission without the dedication of committed partners like Glendale Adventist Medical Center. Together, we are creating a world with less cancer and more birthdays.

The American Cancer Society provides information, day-to-day help, and emotional support to people with cancer and their families. Our help is free. Call (800) 227-2345 to talk with one of our cancer information specialists 24-hours a day, seven days a week, or visit us online at www.cancer.org.

Continuing Medical Education 2013 *(CON'T)*

November 13, 2013

Lung Cancer Update for the Primary Care Physician

Marianna Koczywas, MD, Clinical Professor, Division of Medical Oncology and Therapeutic Research, Thoracic Oncology and Lung Cancer Program, City of Hope

November 20, 2013

Bladder and Prostate Cancer Studies Utilizing NCCN Guidelines for Treatment and TNM staging; Electronic TNM staging

Kamyar Ebrahimi, MD, Urologist; Surgical Therapeutics and Advanced Robotics; Glendale Adventist Medical Center

Sara H. Kim, MD, Medical Director, Department of Radiation; Glendale Adventist Medical Center

Multidisciplinary Tumor Board Conference

Kathie Morgan, CTR, Cancer Registry

The Multidisciplinary Tumor Board Conference provides GAMC cancer specialists an opportunity for helpful and meaningful discussions relating to the treatment of cancer on an individual patient basis. This process promotes excellence in cancer patient care.

Glendale Adventist Medical Center Tumor Board Conferences are held weekly at 7AM in Committee Rooms A/B. Surgical Tumor Boards are held three times a month and a dedicated Breast Tumor Board is held once a month co-moderated by a radiologist specializing in mammography, breast MRI and disease relating to the breast.

The cancer registry staff gathers the information required for discussion that includes medical history and pertinent pathology, and radiology materials for review. Multi-disciplinary tumor boards are moderated by a surgeon, medical oncologist or radiation oncologist. Both prospective and retrospective cases are discussed. Physicians are encouraged to bring any and all cases they feel the discussion of treatment would be of benefit to both them and their patients for further care.

Tumor boards provide the presenting physicians with the opportunity to obtain treatment information from the multi-disciplinary perspective.

The American College of Surgeons requires that the number of cases presented annually is proportional to 10% of the analytic caseload and represents the institution's case mix. Glendale Adventist's 2012 analytic caseload was 609 and 18% of this caseload was presented at the Tumor Board Conferences.

2012 PRIMARY SITES DISCUSSED	CASES
BLADDER	7
BREAST	22
COLON	5
ENDOMETRIUM	1
ESOPHAGUS	2
GLIOMA	1
HEAD & NECK	1
KIDNEY	1
LIVER	5
LUNG	7
LYMPHOMA	7
MESOTHELIOMA	3
OTHER (may not be cancer)	12
OVARY	1
PANCREAS	7
PENIS	2
PROSTATE	8
RECTUM	1
SKIN (Metastatic)	1
SMALL INTESTINE	1
STOMACH	3
SOFT TISSUE	2
TESTICLE	1
THYROID	2
UNKNOWN PRIMARY	3
TOTAL: This total reflects total cases presented	107

Year-by-Year Statistics

Primary Site	2006	2007	2008	2009	2010	2011	2012
All Sites	541	547	567	578	624	627	609
Oral Cavity/Pharynx	11	9	12	15	20	17	21
Esophagus	3	3	5	2	8	5	2
Stomach	14	19	11	23	18	20	17
Colon	68	46	51	55	57	56	59
Rectum and Rectosigmoid	25	21	23	23	21	16	18
Pancreas	14	15	11	16	21	14	19
Lung	51	45	53	65	82	62	63
Leukemia Myeloma and Hematopoietic	20	22	24	22	26	27	23
Soft Tissue	2	4	1	3	4	3	6
Melanoma of the Skin	12	10	7	6	7	11	14
Breast	81	88	120	101	91	120	115
Corpus Uteri	14	17	14	21	15	21	18
Ovary	9	5	11	8	10	16	17
Prostate	29	38	30	29	43	40	33
Bladder	18	30	21	25	32	40	26
Kidney/Renal	7	8	21	7	10	12	14
Brain/Nervous System	39	47	49	36	55	47	29
Endocrine	39	32	26	41	34	39	35
Lymphatic System	27	28	28	32	27	27	29
Unknown Primary	7	9	7	8	14	4	9

Includes analytic cases only (diagnosed at GAMC and received first course treatment).

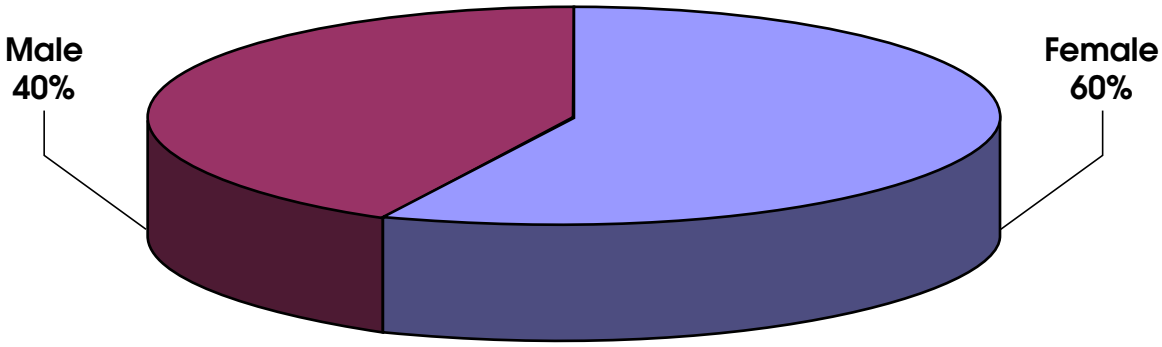
2012 Primary Site Table

Site Group	Total Cases	Class		Sex	
		Analytic	Non Analytic	Male	Female
ALL SITES	664	609	55	267	397
BREAST	128	115	13	2	126
COLON	61	59	2	22	39
LUNG/BRONCHUS-NON SM CELL	60	57	3	40	20
PROSTATE	36	33	3	36	0
BLADDER	31	26	5	25	6
THYROID	28	26	2	5	23
NON-HODGKIN'S LYMPHOMA	27	24	3	11	16
PANCREAS	21	19	2	12	9
STOMACH	19	17	2	8	11
RECTUM & RECTOSIGMOID	19	18	1	15	4
CORPUS UTERI	19	18	1	0	19
OTHER NERVOUS SYSTEM	19	19	0	2	17
OVARY	18	17	1	0	18
MELANOMA OF SKIN	14	14	0	5	9
KIDNEY AND RENAL PELVIS	14	14	0	9	5
MYELOMA	13	12	1	8	5
LEUKEMIA	12	7	5	9	3
BRAIN	11	10	1	3	8
UNKNOWN OR ILL-DEFINED	10	9	1	7	3
CERVIX UTERI	9	9	0	0	9
OTHER ENDOCRINE	9	9	0	5	4
LIVER	8	7	1	6	2
LARYNX	7	7	0	5	2
SALIVARY GLANDS, MAJOR	6	5	1	4	2
LUNG/BRONCHUS-SMALL CELL	6	6	0	3	3
SOFT TISSUE	6	6	0	2	4
GALLBLADDER	5	4	1	1	4
OTHER HEMATOPOIETIC	5	4	1	2	3
HODGKIN'S DISEASE	5	5	0	4	1
BILE DUCTS	4	4	0	1	3
MOUTH, OTHER & NOS	3	3	0	1	2
NASOPHARYNX	3	3	0	2	1
SMALL INTESTINE	3	3	0	1	2
UTERUS NOS	3	2	1	0	3
ESOPHAGUS	2	2	0	1	1
ANUS,ANAL CANAL,ANORECTUM	2	2	0	1	1
OTHER DIGESTIVE	2	2	0	1	1
PLEURA	2	2	0	1	1
VULVA	2	1	1	0	2
TONGUE	1	1	0	0	1
FLOOR OF MOUTH	1	1	0	1	0
TONSIL	1	1	0	1	0
OROPHARYNX	1	0	1	1	0
HYPOPHARYNX	1	1	0	1	0
RETROPERITONEUM	1	0	1	0	1
OTHER SKIN CA	1	1	0	1	0
VAGINA	1	1	0	0	1
OTHER FEMALE GENITAL	1	1	0	0	1
TESTIS	1	0	1	1	0
PENIS	1	1	0	1	0
URETER	1	1	0	0	1

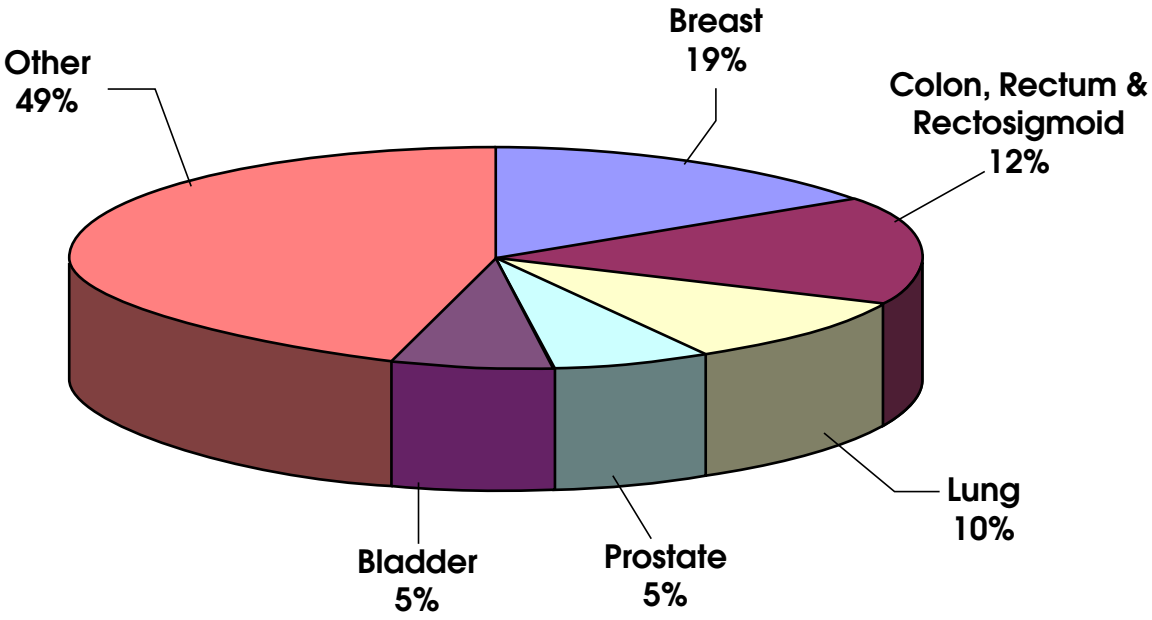
2012 Primary Site Table

Stage 0	Stage I	Stage II	Stage III	Stage IV	N/A	Unknown
36	134	101	89	104	77	68
20	36	29	18	8	0	4
5	7	16	15	6	0	10
2	6	3	10	31	1	4
0	5	14	6	3	0	5
6	13	4	1	1	0	1
0	14	4	4	0	0	4
0	5	3	4	10	0	2
0	3	6	0	8	0	2
0	3	2	3	6	0	3
0	1	4	4	1	0	8
1	6	0	2	3	1	5
0	0	0	0	0	19	0
0	4	1	4	5	0	3
0	9	3	0	0	0	2
0	5	2	2	4	0	1
0	0	0	0	0	12	0
0	0	1	0	0	6	0
0	0	0	0	0	10	0
0	0	0	0	0	9	0
0	3	1	2	1	0	2
0	0	0	0	0	9	0
0	1	0	1	1	1	3
1	2	2	1	0	0	1
0	2	2	0	1	0	0
1	0	0	0	4	0	1
0	2	0	2	0	1	1
0	0	0	1	3	0	0
0	0	0	0	0	4	0
0	2	1	0	2	0	0
0	0	0	2	1	1	0
0	0	0	1	1	0	1
0	0	1	1	1	0	0
0	0	0	3	0	0	0
0	1	0	0	1	0	0
0	1	0	0	0	0	1
0	0	1	0	0	0	1
0	0	0	0	0	2	0
0	0	0	0	0	1	1
0	0	0	1	0	0	0
0	0	0	0	0	0	1
0	1	0	0	0	0	0
0	0	0	0	0	0	1
0	0	0	0	0	0	0
0	0	0	0	1	0	0
0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	1	0	0	0	0	0
0	0	0	0	1	0	0
0	0	0	0	0	0	0
0	1	0	0	0	0	0
0	0	1	0	0	0	0

2012 MALE/FEMALE RATIO N=664



2012 TOP FIVE SITES N=664



Clinical Trials Research: Behind the Scenes

Cancer research is basic research into cancer in order to identify causes and develop strategies for prevention, diagnosis, treatments and cure. Cancer research ranges from epidemiology and molecular bioscience to the performance of clinical trials to evaluate and compare applications of various cancer treatments. These applications include surgery, radiation therapy, chemotherapy, hormone therapy, immunotherapy and combined treatment modalities, such as chemo-radiotherapy. Starting in the mid-1990s, the emphasis in clinical cancer research shifted towards therapies derived from biotechnology research, such as immunotherapy and gene therapy.

Glendale Adventist Medical Center's Cancer Services is the only cancer program serving Glendale, California, to be accredited by the American College of Surgeons Commission on Cancer as a Community Hospital Comprehensive Cancer Program. As part of these exceptional standards, we also participate in cancer research by investigating the coordination of the various applications of treatments among surgeons, medical and radiation oncologists, diagnostic radiologists, pathologists and other cancer specialists, resulting in improved patient care. Some of the most common types of cancer treated in our community are breast cancer, prostate cancer, colon cancer and brain cancer.

Building relationships within the oncology research community has helped to expand our research activities. These activities help support the hospital's mission, "To share God's love with our community by promoting healing and wellness for the whole person," by offering patients treatment options that include innovative therapies targeted at reducing the burden of cancer.

Gastric Carcinoma

Mehdi Khorsandi, MD, Gastroenterology

Gastric cancer is the fourth most common cancer and is the second cause of cancer mortality worldwide. Approximately 90-95% of gastric tumors are malignant with a reported 90-95% of malignant tumors being carcinoma, 5-15% lymphoma, and 1-2% leiomyosarcoma. Gastric cancer is also more prevalent in certain geographic regions and certain races. There is a higher incidence of gastric cancer in Japan, Finland, Iceland, Brazil, Korea and China. Based on the annual reported data between 2003-2007 in the United States, there is a higher prevalence of gastric cancer in males (1.5-2x) between ages 50-75 years. When this is subdivided further by ethnicity, incidence is more common in Asians and Pacific Islanders than white men (17.2 per 100,000 versus 8.7 per 100,000). Similar reports also show that age-adjusted mortality rate for stomach cancer in men was about 5.3 per 100,000 with a higher incidence in African-American males versus white males (10.7 per 100,000 versus 4.6 per 100,000). Similar findings have been reported in women with a higher incidence of gastric cancer in Asian and Pacific Islanders versus white women (9.7 versus 4.1 per 100,000).

Gastric Cancer Classifications

1) By Gross classification:
   Ulcerative – most common, fungating – least common, polypoid, infiltrative or diffuse, superficial.
2) By Lauren classification:
   Diffuse type – Signet-ring or anaplastic – poorly differentiated, and is most common in the U.S.
   Intestinal type – well differentiated, gland forming tumor, usually presents as focal ulceration or polypoid mass.
3) By Ming Classification:
   Expanding type – intestinal type tissue. Common in Japan and China.
   Infiltrative type – Signet ring cells, Linitus Plastica and diffuse type.
4) By location:
   Distal intestinal type
   Proximal type

Risk Factors Associated with Gastric Cancer

Risk factors associated with gastric cancer include diets high in salt, complex carbohydrates, nitrites, nitrates or nitrosamines, as well as, diets low in animal fat, vegetables and vitamin C deficiency and increased consumption of processed meat, smoking, and obesity (especially with BMI >25). Childhood cancer is associated with increased risk of GI subsequent malignant neoplasms, especially if exposed to abdominal radiation, and GERD with cardia gastric cancer.

Since 1994, *H. pylori* has been classified as a class I carcinogen in humans by the World Health Organization. This classification was based on epidemiological evidence of its role in the pathogenesis of gastric cancer. *H. pylori* has been associated with at least two fold increased risk in development of gastric cancer, especially in patients younger than 30 years of age. Also, *H. pylori* directly affects the carcinogenic mechanisms of gastric cancer by inducing chronic inflammatory gastritis, which can lead into chronic atrophic gastritis, intestinal metaplasia, dysplasia and finally, intestinal-type Adenocarcinoma. In Asia, where there is a high incidence of *H. pylori* infection, a recent meta-analysis of seven randomized trials showed that eradication of *H. Pylori* has the potential to prevent gastric cancer. Despite the above information, the relationship between *H. pylori* infection and gastric cancer lacks evidence of a true causal relationship and its carcinogenic mechanism remains to be further elucidated.

Other risk factors include partial gastrectomy (10-20 years post BII), Pernicious anemia, gastric adenomas – especially with polyps > 2 cm, common variable immunodeficiency, mucosal atrophy and chronic gastritis with intestinal metaplasia, organ transplant, and hereditary diffuse gastric cancer syndrome due to germ-line E-cadherin mutation. In Asians, there is an association between glutathione S-transferase M1 null genotype and gastric cancer.

Clinical Presentation

The majority of patients with gastric cancer present with anorexia and weight loss (70-80%), along with epigastric pain (70%). Other associated findings include nausea, change in bowel habits, anemia, dyspepsia, early satiety (mostly in Linitis Plastica), obstruction, perforation,

vomiting, weakness, fatigue and, less commonly, gross GI bleeding. In the case of cancer involving the cardia, patients may also present with dysphagia. Patient symptoms usually present late in the course of the disease. In the majority of cases, physical examination is non-specific and diagnosis is made mostly by endoscopy with biopsy and brush cytology (95-99%). CEA levels may be increased and plasma fibrinogen >310 mg/dl is associated with lymph node and liver metastases. Also, loss of Deleted in Colon Cancer (DCC) protein and over expression of p53 protein is associated with later stages of the disease.

Staging of Gastric Cancer

Stage	0	IA	IB	IB	IIA	IIA	IIA	IIB	IIB	IIB	IIB	IIIA	IIIA	IIIA	IIIB	IIIB	IIIB	IIIC	IV
T	tis	T1	T2	T1	T3	T2	T1	T4a	T3	T2	T1	T4a	T3	T2	T4b	T4a	T3	T4b or T4a	any
N	N0	N0	N0	N1	N0	N1	N2	N0	N1	N2	N3	N1	N2	N3	N0-1	N2	N3	N2-N3 or N3	any
M	M0	M0	M0	M0	M0	M0	M0	M0	M0	M0	M0	M0	M0	M0	M0	M0	M0	M0	M1

Primary Tumor

TX – primary tumor cannot be assessed
T0 – no evidence of primary tumor
Tis- carcinoma in situ, without invasion of lamina propria

T1 – invades lamina propria, muscularis mucosa, or submucosa
  T1a – invades lamina propria or muscularis mucosa
  T1b – invades submucosa
T2 – tumor invades muscularis propria
T3 – tumor invades subserosal connective tissue without invasion of visceral peritoneum or adjacent structures
T4 – tumor invades serosa or adjacent organs
  T4a – invades serosa (visceral peritoneum)
  T4b – invades adjacent organs (spleen, transverse colon, liver, diaphragm, pancreas, abdominal wall, adrenal gland, kidney, small intestine and retroperitoneum)

Regional lymph nodes

NX – regional lymph nodes cannot be assessed
N0 – no regional lymph nodes metastasis
N1 – metastasis in 1 to 2 regional lymph nodes
N2 – metastasis in 3 to 6 regional lymph nodes
N3 – metastasis in ≥7 regional lymph nodes
  N3a – metastasis in 7 to 15 regional lymph nodes
  N3b –metastasis in ≥16 regional lymph nodes

Distant Metastasis

M0-no distant metastasis
M1-distant metastasis

Gastric Cancer Management

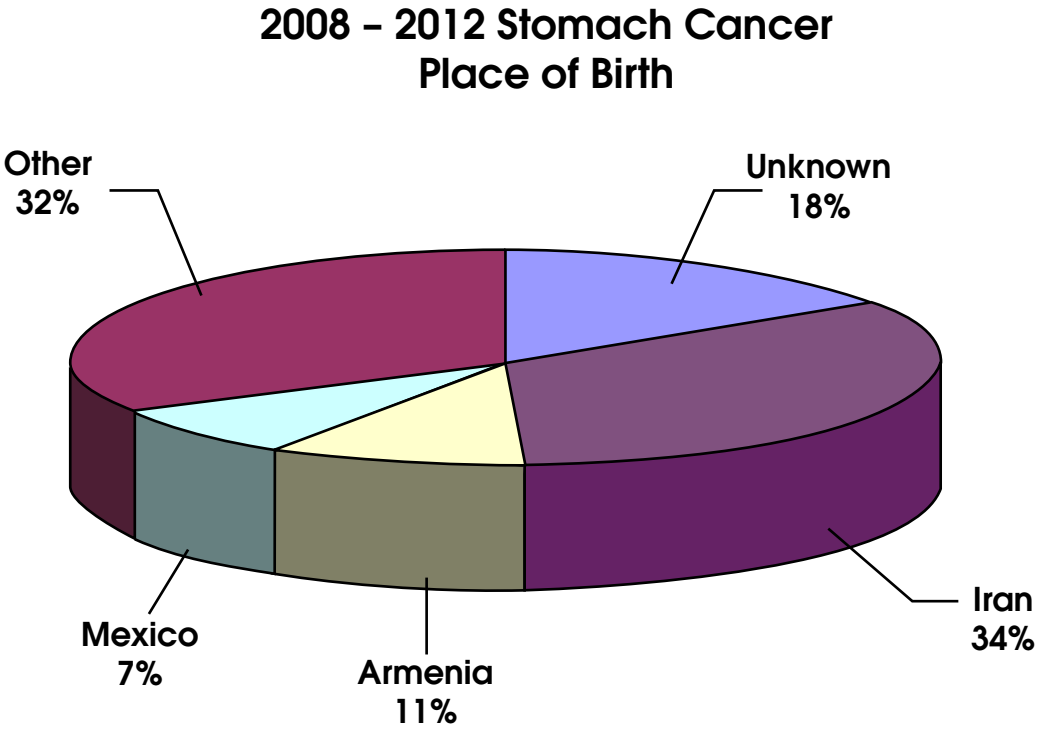
Radical (total or subtotal) gastrectomy remains the gold standard treatment in the world with the extended D2 lymphadenectomy more accepted in Eastern Asia, whereas limited D1 resection with chemo-radiotherapy is more frequently used in western countries.

Stomach Cancer

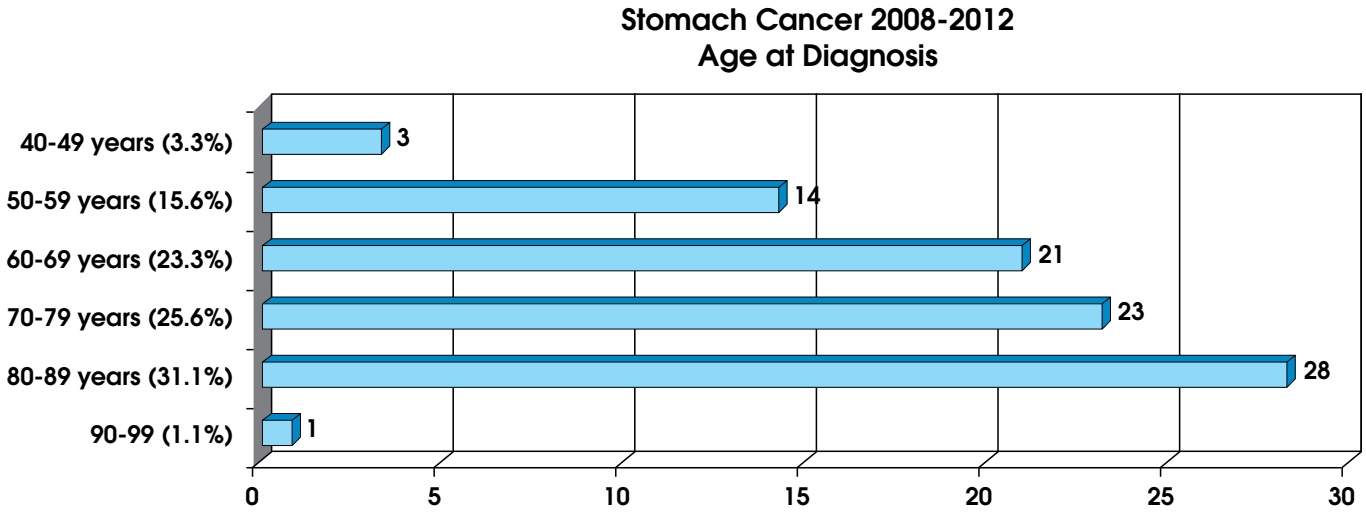
Boris Bagdasarian, DO, Hematology and Oncology, Chairman, Cancer Committee

The incidence of gastric cancer has varied throughout the past century. In the United States, while the incidence has been decreasing approximately 65-70% during the past thirty years, the incidence of gastroesophageal tumors has increased. The highest incidence of gastric cancer remains in areas where the quality of water is poor and where the storage of fresh food is unavailable.

In Japan, the incidence of gastric cancer remains high and efforts have been made to screen this population for early stage disease. The Japanese have a better prognosis, which many believe is attributed to the superiority of surgical techniques. A study of migrant populations has supportive evidence for the effect of environmental influences on the development of gastric cancer. In Glendale, where there is a large Armenian population, we have seen an increased incidence in gastric cancer among Armenians immigrating from Armenia and Iran. This data supports the concept that gastric cancer is influenced by social economic, nutritional and medical factors rather than genetic predisposition.



The lowest incidences of gastric cancer are in western cultures and in individuals of higher social economic status. In the United States, gastric cancer develops twice as often in men than women and is more frequent in black men than white men, with the incidence increasing with age starting in the fifth decade. The rise of adenocarcinoma of the proximal stomach and distal esophagus may possibly be associated with the prevalence of obesity, elevated body index, and increased incidence of gastroesophageal reflux disease. Individuals who utilize aspirin and non-sterile anti-inflammatory agents have a lower risk of developing gastroesophageal junction and proximal gastric tumors.



Factors associated with an increased risk of gastric cancer include the consumption of large amounts of smoke or cured foods, poor quality of drinking water, high salt and nitrate intake, and diets low in vitamins A and C. *H. pylori* infection, cigarette smoking, prior gastric surgery for benign disease, and ulcer disease have also been implicated as risk factors. Genetic risk factors include pernicious anemia, family history of gastric cancer, Li-Fraumeni syndrome and hereditary non-polyposis colon cancer.

Gastric cancer precursor lesions include adenomatous gastric polyps, chronic atrophic gastritis, dysplasia, and intestinal metaplasia. Results from several studies have demonstrated an increased likelihood of *H. pylori* infection especially for those who develop distal stomach malignancies. Most patients with *H. pylori* infections do not develop gastric cancer; the increased risk has raised the issue whether the treatment of *H. pylori* might decrease the risk of gastric cancer. A large Chinese study showed no benefit in the prevention of gastric cancer with eradication of *H. pylori*. Although recent met-analysis suggested that eradication could have reduced the risk of gastric cancer, at the present time we only recommend *H. pylori* eradication in patients with ulcerative disease.

Interventions for Reduction of Gastric Cancer Risk

Smoking Cessation

We have solid evidence that smoking is associated with an increased risk of gastric cancer. The 2004 surgeon general's report demonstrated a relative risk of 1.6 in current smokers and 1.2 in former smokers. These observations indicate that cigarette smoking prevention or cessation would result in a decreased risk of gastric cancer.

H. pylori Infection

Eradication, as discussed, on a mass scale is not recommended unless the patient has evidence of ulcerative disease.

Diet

Excessive salt intake and dietary deficiencies such as a lack in vitamin C, vegetables, fruits, and foods of plant origin, are associated with a higher incidence of gastric cancer. Diets high in whole grain cereals, carotenoids, and green tea are also associated with the reduced risk of the cancer.

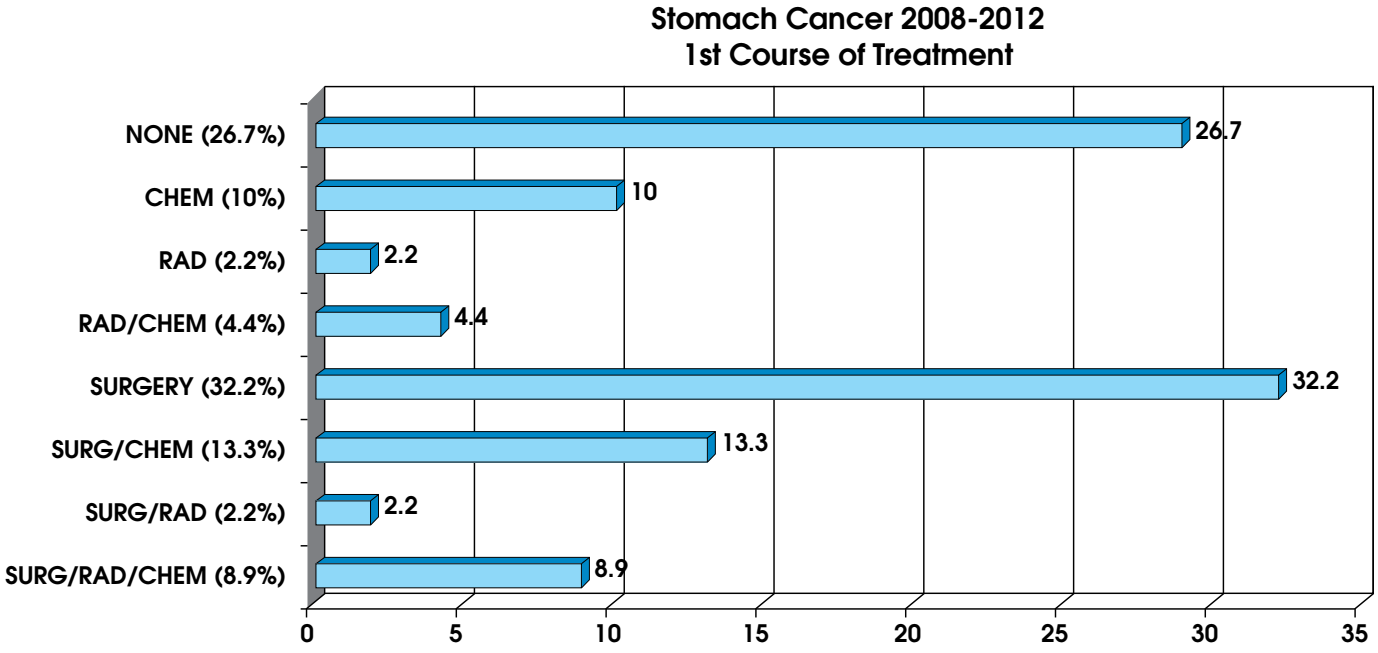
Stomach Cancer

Diagnosis

The common presenting symptoms of gastric cancer are pain, hematemesis, dry blood loss, dyspepsia, and anorexia. Early gastric cancer often does not cause symptoms. Clinical manifestations are often a result of metastatic spread. The important diagnostics studies utilized are upper endoscopy with direct biopsy, barium swallow and CT imaging. Areas of high cancer incidence such as Japan, with its mass screening programs, have been successful in early detection and higher cure rates have been observed after surgical intervention. The role of endoscopic ultrasound is less clear in gastric cancer than in esophageal and gastroesophageal junction cancers.

Treatment

The only curative treatment approach for patients with gastric cancer is surgery. In the United States, the D1 resection, which involves removal of only the perigastric lymph nodes, compared to the D2 resection, which was commonly used in Asia and includes meticulous resection of all regional lymph nodes, has direct retrospective data found to demonstrate that D2 resection is better than the outcome of D1 resections. The initial studies do not demonstrate a survival benefit of D2 versus D1 dissection, however, a 15 year follow-up randomized Dutch trial of over a thousand patients revealed that D2 lymphadenectomy was associated with a lower local regional recurrence (12 versus 22%) and gastric cancer related death rates (37 versus 48%) than D1 surgery.

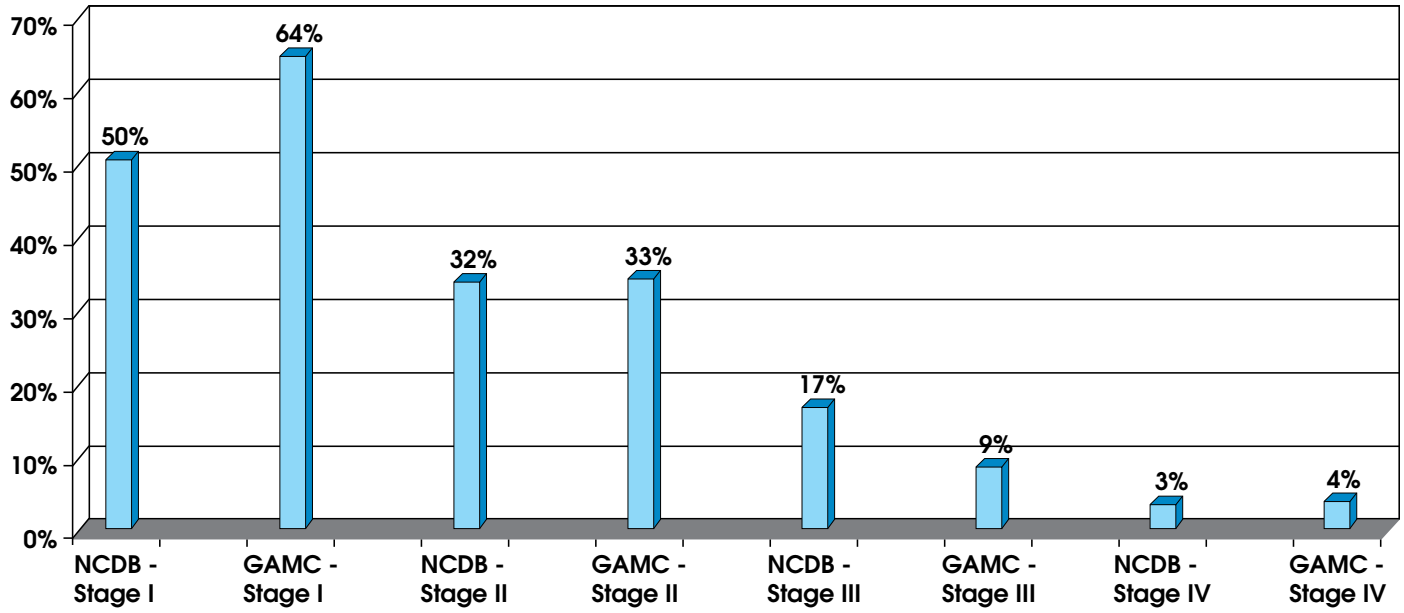


Early Stage Disease

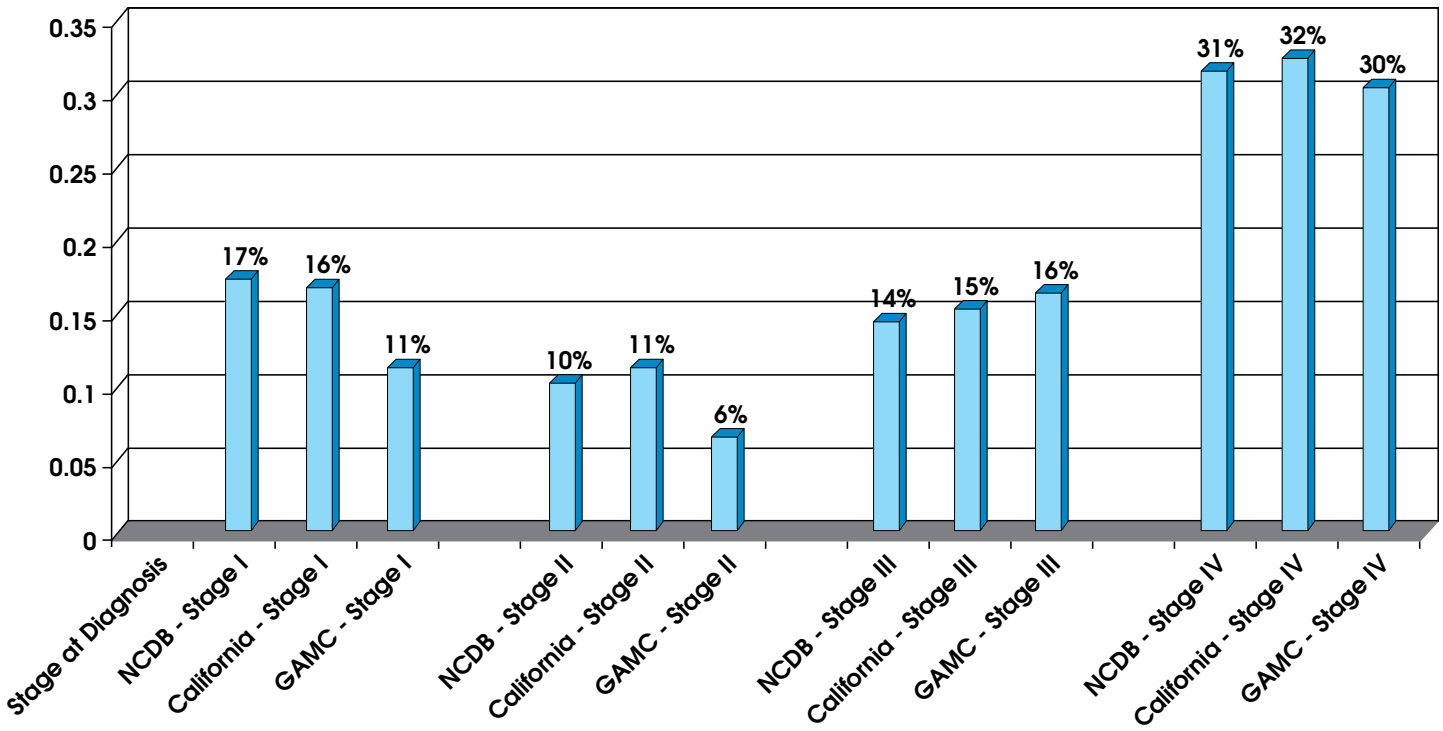
Surgical intervention has led to cures of 75 to 80% in patients with early stage node negative disease.

However, the five-year survival for Stage 3 disease is less than 25%, which is reflected in the comparison data below.

Stomach Cancer 2003–2005
5–Year Survival by Stage
NCDB Compared to GAMC



Stomach Cancer 2000–2010
NCDB Compared to California and GAMC
Stage at Diagnosis



Late diagnosis of stomach cancer is evidenced in the previous graph, with most cancers being diagnosed in Stages 3 and 4 in GAMC, the State of California, and those cases submitted to the NCDB.

Many phase 3 randomized trials utilizing chemotherapy alone have not demonstrated a trend towards improved survival. However, a randomized phase 3 trial, which included adjuvant chemotherapy combined with radiation therapy in patients with Stage 1, 2, 3 gastroesophageal or gastric cancers randomly assigned to receive either surgery alone or surgery followed by bolus 5FU/leucovorin based chemotherapy with sandwich chemo/radiation therapy (45 gray) with lowest 5FU/leucovorin as a radio sensitizer, has revealed a 20% improvement in survival for the group receiving the combined modality treatment. The median overall survival in the surgery only group was 27 months compared to 36 months in the chemo/radiation group. These trial results established a new standard of care for patients with gastric cancer in the United States. More recently, a large CALGB lead inter group trial (C80101) tried to improve the results obtained from the bolus 5FU/leucovorin plus radiation therapy by randomly assigning patients with receptive gastric cancer to the standard radio/chemotherapy with ECF. The study did not demonstrate any difference in outcome between the two arms, although it is of note that only one cycle of ECF was administered before and two cycles after standard 5FU base chemo/radiation therapy in the experimental arm, with not all patients being able to complete the whole duration of the adjuvant treatment.

Operative chemotherapy with the ECF regimen administered before or after surgery for resectable gastric cancer, has also shown a significant overall survival benefit compared to surgery alone. It is of note that approximately 55 percent of patients in the preoperative chemotherapy group actually received post resection therapy, which suggests that the main therapy component responsible for the improved outcome was the preoperative treatment phase.

Based on the previously mentioned trials and met-analysis, either post-operative chemotherapy (United States), pre and post-operative chemotherapy (United Kingdom), or adjuvant chemotherapy alone after the D2 resection (Asia), can be regarded as standards of care for the management of early stage gastric cancer. Neoadjuvant chemotherapy has been shown to shrink primary tumors in regional lymph nodes in phase 2 clinical trials with intriguing results; however, these small studies have not established any definitive role for pre-operative neoadjuvent chemotherapy with or without radiation and facilitating resection of initially unresectable tumors.

Advanced Disease

The medical treatment for metastatic gastric cancer is primarily palliative and incurs a moderate effect on overall survival. Multiple agents are active which include platinum agents, taxanes, fluorouracil, capecitabine, irinotecan and others, including trastuzumab on Her-2 over expressing gastric cancers. Combination regimens, which are also associated with increased overall survival, have higher response rates when compared to single agent therapies.
The first targeted agent with documented efficacy in advanced gastric and gastroesophageal junction cancer was trastuzumab, the humanized monoclonal antibody against Her-2. Based on preclinical observations that approximately 20% of gastric cancers (and approximately 30% of gastroesophageal adenocarcinoma) overexpressed Her-2. They recently presented phase 3 trastuzumab in gastric cancer trials and investigated whether the addition of trastuzumab to standard chemotherapy would extend survival in patients with advanced disease. Only 22.1% of the tumors evaluated expressed Her-2 using immunohistochemistry and fluorescence in situ hybridization analysis. The trial was the first phase 3 trial to demonstrate a survival advantage with the addition of biologic agent, trastuzumab, to standard chemotherapy in advanced gastric cancer. Combination therapies of trastuzumab added to standard chemotherapy have emerged as a standard of care in patients with metastatic, Her-2 overexpressing gastric and gastro-esophageal cancers. Radiation therapy can be effective for metastatic disease for palliative purposes and, perhaps, for unresectable, bleeding tumors in conjunction with chemotherapy, but is rarely used to treat primary, advanced, unresectable gastric cancer.

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Pathogenesis and Pathology of Gastric Malignancy

Michele M. Cosgrove, MD, Pathology/Laboratory

Introduction

Three most frequent pathologic categories of gastric malignancy are carcinoma, lymphoma and stromal tumors. Definitive diagnosis usually involves tissue or cytology sampling for pathologic evaluation.

Adenocarcinoma

This is the most frequent type of gastric malignancy and is the second most common cause of cancer-related death worldwide. The United States and Western Europe have a lower incidence of gastric carcinoma than Asia and South America, likely due to differences in rates of Helicobacter infections, discussed below. While the overall incidence of gastric adenocarcinoma is decreasing, gastric cardia cancer, which arises in the proximal part of the stomach near the junction with the esophagus, is increasing in recent decades.

Intestinal Type Adenocarcinoma

This type is the most common histologic differentiation and derives its name from the fact that under the microscope, tubules and structures resembling intestinal mucosa are seen. This variant is the most common type seen in populations with a high incidence of gastric carcinoma. Risk is related to smoking, diet, and alcohol use. Another important risk factor is infection with *H. pylori*. While many gastric carcinoma associated genetic abnormalities have been identified, a well-defined sequential progression of genetic changes that correspond to the observed pathologic progression from inflammation/gastritis, to atrophy/loss of acid secreting cells, intestinal metaplasia, dysplasia and finally cancer remains to be discovered. K-ras mutation, tumor suppressor genes and DNA hypermethylation all have proposed roles in the development of gastric intestinal type adenocarcinoma.

Diffuse Type Adenocarcinoma

This subtype is less common in high-risk populations but accounts for up to half of the gastric adenocarcinoma in the U.S. Under the microscope, tumor cells are seen to invade as individual tumor cells without gland formation. Sometimes, mucin in the cells pushes the nucleus to the side of these individual cells producing the so-called "signet-ring" appearance. This variant is clinically more aggressive than the intestinal type, with more metastatic potential, rapid disease progression and more extensive local invasion. Diffuse gastric carcinomas usually arise de novo without progressing through the gastritis, atrophy, intestinal metaplasia, and dysplasia series of histologic changes. They are less strongly associated with *H. pylori*. At the molecular level, there is often loss of expression of the cell adhesion protein E-cadherin, coded by the CDH1 gene. This explains the tendency of the cancer cells to invade as discohesive individual cells. There is a rare familial variant known as hereditary diffuse gastric cancer.

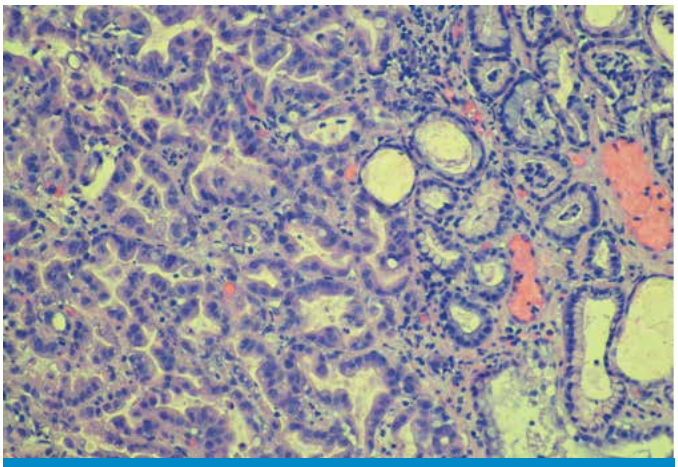

Figure 1A. Adenocarcinoma Intestinal Type Hematoxylin and Eosin (H and E) stain, 200x

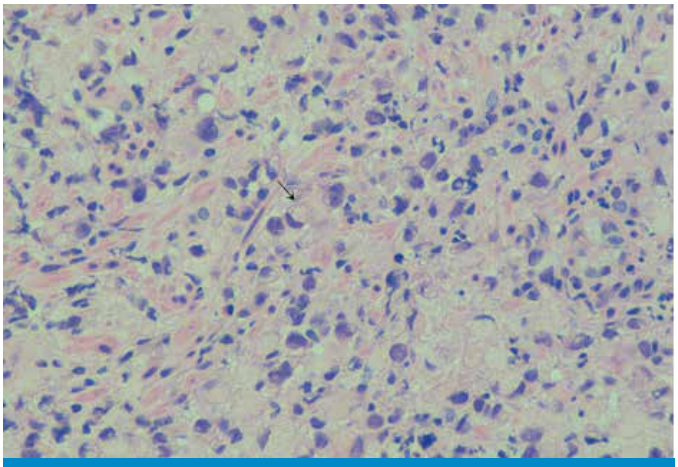

Figure 1B. Gastric Adenocarcinoma Diffuse Type, H and E stain, 400x, arrow on signet ring cell

Her2/neu expression in Gastric Adenocarcinoma

Up to 15% of gastric adenocarcinomas demonstrate overexpression of the Her2/neu gene, particularly those of the intestinal type. Her2/neu amplification has been shown to be an independent predictor of poor prognosis. Tumors with Her2/neu overexpression may respond to the drug, Trastuzumab. Her2/neu expression is assessed in the laboratory using immunohistochemistry or in situ hybridization techniques.

Gastric Lymphoma

The stomach is the most common site for extra nodal (not arising in a lymph node) lymphoma. The majority of these are low-grade Non-Hodgkin's B cell lymphoma of the mucosal associated lymphoid tissue (MALT) type. Such tumors behave in an indolent manner, are highly associated with *H. pylori* infection, and may regress completely upon treatment with anti-Helicobacter antibiotics. Higher-grade B-cell lymphomas such as diffuse large B-cell lymphoma may transform from low grade MALT lymphoma or arise de novo.

Gastric Stromal Neoplasms

Gastrointestinal stromal tumor (GIST) is a rare tumor that arises from a specialized cell known as the interstitial cell of Cajal (ICC). Normal ICCs regulate peristalsis and digestive functions. Over half of GISTs arise in the stomach and the majority are malignant. Pathologists use a combination of morphology and immunohistochemical studies to recognize these tumors. Most GISTs express KIT protein demonstrated by positive CD117 immunohistochemistry. Rare exceptions may instead show overexpression of platelet-derived growth factor (PDGF). KIT or PDGF positive GISTs have been found to respond to the drug Imatinib, which is often used in conjunction with surgery to treat this disease. Prognosis can be predicted by tumor staging. The pathologic staging takes into account the rate of cell division (mitotic activity), tumor size, and spread to regional lymph nodes.

Helicobacter Infection and Gastric Neoplasms

H pylori is a spiral shaped, urease-producing bacteria that grows in the mucus lining of the stomach. In 2005, Barry Marshall and Robin Warren received the Nobel Prize in physiology for their work demonstrating the role this organism plays in causing gastrointestinal disease, a discovery that was aided by the fact that Dr. Marshall experimentally infected himself with the organism and developed gastritis. In addition to gastritis, the organism is associated with gastric and peptic ulcers, gastric adenocarcinoma and gastric MALT lymphoma, a type of B-cell lymphoma that usually can be completely eradicated by antibiotic treatment for *H. pylori*.

Helicobacter infection typically begins in early childhood and is most prevalent in the developing world. Untreated chronic infection may eventually lead to sequential precancerous changes culminating in invasive adenocarcinoma. These changes include chronic active gastritis, gastric atrophy, intestinal metaplasia and dysplasia. Although an estimated 3.25 billion people are infected with *H. pylori* worldwide, only about 3/10,000 of them will develop gastric cancer. It is believed that the cancer producing effects of *H. pylori* are influenced by variations in *H. pylori* strains, patient genetic factors, environmental forces and differences in diet. There is evidence that eradication of *H. pylori* infection can prevent the development of cancer in high-risk populations, especially if treatment is undertaken before precancerous changes develop. Widespread implementation of eradication programs is a challenge due to financial cost.

Continued on Page 32

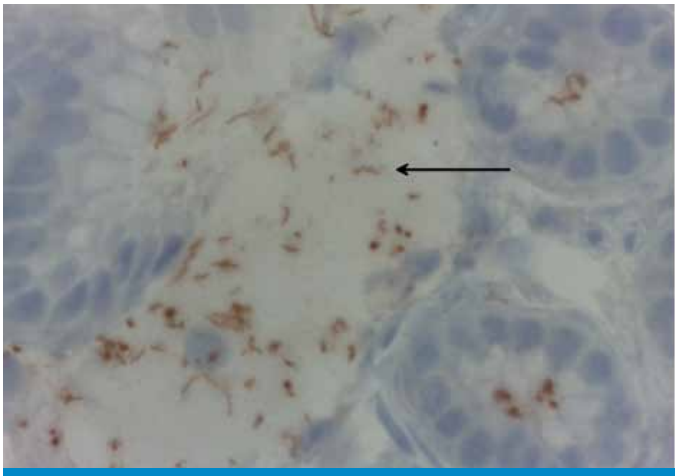

Figure 2. Helicobacter pylori immunostain 1000x, arrow on bacterium

Diagnostic tests for Helicobacter pylori

Helicobacter organisms produce the enzyme, urease, which can be detected by a breath test or a laboratory test on biopsy tissue. Tissue biopsy can also be analyzed pathologically with special stains for Helicobacter. The advantage of a pathology exam is that gastritis, preneoplastic and malignant changes can be comprehensively assessed. Helicobacter antigen can be detected in stool specimens. Helicobacter culture and antimicrobial sensitivity can be performed for cases that fail to respond to conventional antibiotic therapy. Culture is not routinely used due to technical complexity. Serologic tests for Helicobacter antibodies can be performed but are not as clinically useful as other tests.

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The Role of Radiation Therapy for Gastric Cancer

Sara Kim, MD, Radiation Oncology

Surgical resection is the standard treatment for curative intent for gastric cancer. However, surgery alone for gastric cancer results in high local failure rates at the surgical tumor bed. Several prospective randomized trials have shown an increase in local control and overall survival with adjuvant chemoradiation.

The Mayo Clinic conducted a prospective randomized trial which included 62 patients with gastric cancer status post-surgical resection, randomized to no further treatment or radiation with concurrent 5-FU. When analyzed by intent to treat, the adjuvant arm had statistically significant improvement in both relapse-free and overall survival (overall 5-year survival 23% versus 4%. $p < 0.05$).[1]

The United States GI Intergroup Trial (INT 00116) randomized high-risk gastric cancer patients status post-surgery (T2-4 N0 or T1-T4 N1-3) to adjuvant combined 5-FU chemotherapy and radiation to gastric tumor bed versus observation. There were 556 patients enrolled in this prospective randomized trial. With median follow-up of five years, relapse-free survival at three years is 48% for the adjuvant treatment and 31% for observation ($p= 0.001$). The three year overall survival is 50% with adjuvant treatment and 41% with observation ($p=0.005$). The median overall survival in the surgery only arm was 27 months, compared with 36 months in the adjuvant treatment arm. The median duration of relapse-free survival was 30 months in the chemoradiation group and 19 months in the surgery only group.[2]

The results of this large U.S. GI Intergroup Trial demonstrate a clear survival advantage with adjuvant chemoradiation in resected high-risk gastric cancer patients.

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Class Of Case/Collaboration

Class of Case

Analytic: Cases that are first diagnosed and/or receive all or part of their first course of treatment at Glendale Adventist Medical Center.

Non-Analytic: Cases that have been diagnosed and have received their entire first course of treatment elsewhere and are first seen at Glendale Adventist Medical Center for subsequent care.

Collaboration

In order to accomplish the wide-ranging and ambitious goals involved in designing and supporting a comprehensive community cancer program, many people have contributed and continue to give their energy and expertise.

The contributions and support of the medical staff, nursing staff and many other professionals who have offered their expertise for the implementation of our cancer program throughout the year are greatly appreciated.

Special appreciation is given to all members of the Cancer Committee and the Cancer Registry for their involvement in preparing this annual report.

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