Patients First
Samsung Comprehensive Cancer Center was established in 2008 as the first and the largest cancer center in Korea. With our relentless endeavor for the betterment of humanity, we deliver the best care, research, and education to control cancer.

The Outcomes Book summarizes our 12 years of experience in cancer care reflecting. We, Samsung Comprehensive Cancer Center keeps creating an advanced standard of cancer care.
In January 2008, Samsung Comprehensive Cancer Center was established as the Korea’s first specialized cancer center with 11 floors, 8 basement floors, and 700 beds. It has been providing the highest quality of cancer treatment.

In April 2013, to provide comprehensive cancer care, the Cancer Center was reborn as a Comprehensive Cancer Center. Our vision ourselves as “A designated place for the best cancer care and outcome.” We tried to achieve our vision in the past 12 years by providing multidisciplinary care, adapting high technologies, and developing the best supportive care system. First, we changed the existing cancer care system to be more patient-centered. Multidisciplinary care, which provides the best treatment to patients by different specialists, was developed and integrated into the system innovating the cancer care system. Secondly, we took advanced technologies such as robotic surgery, single-port surgery, painless radiofrequency treatment, proton therapy, continued our effort to new drug development, and provided more tailored and precise cancer treatment for the best outcome.

Furthermore, we have provided the best supportive care to improve patients’ and their families’ quality of life. We provided the most comprehensive psycho-social and supportive care by providing mental health care, pain relief, rehabilitation, nutrition management, survivorship, and cancer education.

Samsung Comprehensive Cancer Center is the world-class, cancer-specialized institution that provides comprehensive care from diagnosis, treatment, and survivorship. We will continue to put our effort for pursuing our vision “A designated place for the best cancer care and outcome.” Thank you!

General Director of Samsung Comprehensive Cancer Center
Seok Jin Nam
In April 2013, we expanded our cancer division to Cancer Center in an effort to provide a more specialized and comprehensive care. In 2017, we established our vision and long-term strategies to achieve the highest level of health outcome and patient satisfaction.
To provide the best clinical care, research, and education for the betterment of humanity.

2008
OPEN
(first Comprehensive Cancer Center in Asia)

2009–2010
30,000 cases of radiotherapy
Introduction of new gamma knife model "Perfexion"
Establishment of HIFU center, and Asia’s first MR-HIFU training center designation MoU with Philips
Korea’s No. 1 clinical trial center
1st Samsung Comprehensive Cancer Center symposium

2010
5,000 cases of liver cancer radiofrequency ablation (the world’s largest)
1,000 cases of single-port surgery (Korea’s first)
Best 5-year survival outcome in patients with surgical lung cancer
No. 1 clinical trial center for lung cancer
1st International symposium

2011
5,000 cases of liver cancer radiofrequency ablation (the world’s largest)
1,000 cases of single-port surgery (Korea’s first)
Best 5-year survival outcome in patients with surgical lung cancer
No. 1 clinical trial center for lung cancer
1st International symposium

2012
10,000 cases of thoracoscopic surgery (Korea’s first)
5,000 gamma knife surgical cases achieved at the fastest rate in Korea
Lowest death rate in 30 days after receiving surgery for gastric & colorectal cancers (Health Insurance Review and Assessment Service)
Initiation of BRAVO project, Samsung Medical Center and Goldman Sachs (supporting breast cancer survivors to return to society)
2nd Samsung Comprehensive Cancer Center symposium

2013
10,000 cases of thoracoscopic surgery (Korea’s first)
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Initiation of BRAVO project, Samsung Medical Center and Goldman Sachs (supporting breast cancer survivors to return to society)
2nd Samsung Comprehensive Cancer Center symposium

2014
Officially Launched as Cancer Medical Center
6,000 cases of gamma knife for brain tumor
Korea’s first successful paranasal sinus cancer surgery using a 3D printer
1,500 cases of robotic surgery for genitourinary tumors
No. 1 tertiary hospital with the lowest death rates for gastric and colorectal cancers (Health Insurance Review and Assessment Service)
Designated as a research centered hospital (Ministry of Health and Welfare)
Proposed a new mechanism of brain tumor formation: Intractable cancer research team

2015
Supportive Cancer Center OPEN
3,000 cases of robotic prostate surgery
World’s first one-stop robotic surgery for gastric and kidney cancers
380 reconstruction cases of microvascular free flap for head and neck cancer
Agreement of clinical trial MoU for new anticancer drug for gastric cancer between Samsung Medical Center and AstraZeneca
Asia’s first MR-HIFU training center designation MoU with Philips
1st International symposium

2016
Proton Therapy Center OPEN
500 cases of partial robot-assisted nephrectomy for genitourinary cancers
1,000 cases of endoscopic surgery for brain tumor
Installation of gamma knife model "ICON" (first in Asia)
2,000 cases of stem cell transplantation for adult blood cancer (first in Korea)
6th Samsung Comprehensive Cancer Center symposium

2017
10,000 cases of lung cancer surgery
Over 10,000 patients treated for gynecologic cancer
10,000 cases of laparoscopic surgery for colorectal cancer
10,000 cases of gamma knife surgery
Joint research contract to develop comprehensive medical platform for liver cancer: Agency for Science, Technology and Research of Singapore

2018
5th Samsung Comprehensive Cancer Center symposium

2010–2011
The Proud
No. 1 Brand in Korea

2013
Recognized as the Best Cancer Hospital in Korea
by Deloitte & NK Biz News

2008–2011, 2013, 2018
Medical Korea Award in General Hospital Cancer Center

2010
Gastric Cancer Center (personalized cancer treatment clinic) OPEN
300 cases of intranasal endoscopic brain tumor removal
World’s first discovery of treatment method using personal genome analysis for brain tumor
Joint research MoU on cancer genome analysis with Samsung Medical Center KT
Personalized cancer treatment based on genome: TGen (Translational Genomics Research Institute) MoU agreement
The Fast Track program allows the patients to undergo diagnostic tests and get the results in a single visit. The patient and the doctor can make decision on the treatment plan on the same day if necessary.

We operate the nation’s first patient-centered multidisciplinary treatment system. It makes healthcare more accessible by enabling the patients to make just a single in-person visit to see clinical specialists from 3 or more disciplines to optimize their care.

We created a standardized set of protocols, called the Clinical Pathway (CP), to provide clinical services for the best health outcome of our patients.

Pain is considered beyond just a form of suffering, but as a 5th vital sign and a cause of various problems such as anxiety and depression. We prioritize pain management as a means to alleviate physical and psychological stress to improve treatment outcomes.

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We operate the nation’s first patient-centered multidisciplinary treatment system. It makes healthcare more accessible by enabling the patients to make just a single in-person visit to see clinical specialists from 3 or more disciplines to optimize their care.
Cancer Education Center

We open the first patient education center in Korea. The Cancer Education Center was made to provide accurate information, psychological and social support to patients and family members during their cancer journey. At the CEC, trained oncology nurses provide evidence-based information and psychosocial support by various education programs.

Provision of correct information
- Cancer-related articles from major daily newspapers and magazines
- Video clips from major broadcasting company programs
- Cancer-related data from other institutions inside and outside of Korea

Development of cancer education materials
- Personalized cancer education materials for cancer patients, family members, and society

Provision of education program
- Education programs to provide psychological and social support to patients and family members which improve treatment outcomes and quality of life

Consultation with a specialized nurse
- Resident oncology nursing faculties engage in individual consultation with patients and family members

We provide about 30 programs to help cancer patients and family members to help improve their quality of life.

Cancer Education Program
- 14 things to know about the diagnosis and treatment of pancreatic cancer
- Postcancer treatment guide
- Central venous line management education
- Pain management education with a specialized nurse
- Meeting with other cancer patients (gastric, breast cancer)
- How to communicate with cancer patients
- Music therapy

Distress Screening

Samsung Comprehensive Cancer Center, based on its cutting-edge experience in comprehensive care, has contributed to the standardization of cancer care in the country. As the nation’s leading institution, we began to provide distress screening to minimize the physical and psychological stress of our patients right from the time of cancer diagnosis.

Research on Distress

The Cancer Education Center collaborating with faculty at Lymphoma team studied the relationship between the fear of cancer recurrence (FCR) and death among 467 patients with malignant lymphoma between 2012-2017. They found that the patients who had severe FCR had 2.5 times higher risk of dying compared to patients without severe FCR. This study showed the importance of psychosocial care of cancer patients. Now the research team is developing an intervention program to reduce FCR.

Uniqueness

We provide a variety of education programs to help cancer patients and family members.

Cancer Education Programs

- Cancer Education Program
  - 14 things to know about the diagnosis and treatment of pancreatic cancer
  - Postcancer treatment guide
  - Central venous line management education
  - Pain management education with a specialized nurse
  - Meeting with other cancer patients (gastric, breast cancer)
  - How to communicate with cancer patients
  - Music therapy

- Development of cancer education materials
  - Personalized cancer education materials for cancer patients, family members, and society

- Provision of education programs
  - Education programs to provide psychological and social support to patients and family members which improve treatment outcomes and quality of life

- Consultation with a specialized nurse
  - Resident oncology nursing faculties engage in individual consultation with patients and family members

Cancer Education Programs

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  - Postcancer treatment guide
  - Central venous line management education
  - Pain management education with a specialized nurse
  - Meeting with other cancer patients (gastric, breast cancer)
  - How to communicate with cancer patients
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- Development of cancer education materials
  - Personalized cancer education materials for cancer patients, family members, and society

- Provision of education programs
  - Education programs to provide psychological and social support to patients and family members which improve treatment outcomes and quality of life

- Consultation with a specialized nurse
  - Resident oncology nursing faculties engage in individual consultation with patients and family members
According to the Korea Central Cancer Registry, there were about 229,000 cancer patients in Korea in 2016. Of total 24,700 patients, which comprised about 11% of the entire cancer patient population in Korea, were treated at the Samsung Comprehensive Cancer Center.

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The distribution of patients by gender and cancer type from 2008 to 2017 showed that gastric, lung, and genitourinary cancers were most common in men. Breast, gastric, and colorectal cancers were most common in women.

There are wide range of cancer patients by age at the Samsung Comprehensive Cancer Center. Overtime, patients aged over 70 years have been increasing and in 2017, 21% of the cancer patients were age over 70.
The average numbers of outpatients, surgery, chemotherapy, and radiation therapy per day have been increasing since 2008.

Patients from across the nation came to our Cancer Center and 50.4% of them came from Seoul-metropolitan and Gyeonggi-do area.

Distribution of Cancer Patients by Region

※ Excluding pediatric cancer and thyroid cancer patients
We provide the best care through multidisciplinary treatment and patients treated at the Samsung Comprehensive Cancer Center had excellent outcomes. While, nearly 20% of our cancer patients are at distant stages based on the SEER staging system, the 5-year survival rate is 75.38%. The 5-year relative survival rate is 78.8%. The numbers are comparable to those of world’s leading cancer centers.

The observed survival rate for localized stages was greater than 90%.

Our long-term outcomes provide a solid proof of clinical excellence of the Samsung Comprehensive Cancer Center.

### Survival Rates by Age

The survival rate varies by age groups. The 5-year survival rate is over 60% even for those older than 70 years of age.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Probability of 5-year survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>85.37%</td>
</tr>
<tr>
<td>20-29</td>
<td>88.71%</td>
</tr>
<tr>
<td>30-39</td>
<td>88.39%</td>
</tr>
<tr>
<td>40-49</td>
<td>85.25%</td>
</tr>
<tr>
<td>50-59</td>
<td>78.42%</td>
</tr>
<tr>
<td>60-69</td>
<td>70.40%</td>
</tr>
<tr>
<td>70-79</td>
<td>60.13%</td>
</tr>
<tr>
<td>≥80</td>
<td>46.57%</td>
</tr>
</tbody>
</table>

### Survival by Stage

- **Localized**: 90.68%
- **Regional**: 74.85%
- **Distant**: 25.39%

The survival rate varies by the stage of the disease. The survival rate for localized stages is significantly higher than for regional and distant stages.

### Relative 5-year Survival Rate

The survival rate varies by age groups. The 5-year survival rate is over 60% even for those older than 70 years of age.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach</td>
<td>31.5</td>
<td>76.0</td>
<td>87.8</td>
</tr>
<tr>
<td>Colon &amp; Rectum</td>
<td>64.4</td>
<td>75.9</td>
<td>92.6</td>
</tr>
<tr>
<td>Lung</td>
<td>19.4</td>
<td>28.2</td>
<td>48.3</td>
</tr>
<tr>
<td>Esophagus</td>
<td>19.9</td>
<td>37.4</td>
<td>57.2</td>
</tr>
<tr>
<td>Breast</td>
<td>89.8</td>
<td>92.7</td>
<td>95.2</td>
</tr>
<tr>
<td>Liver</td>
<td>18.4</td>
<td>34.6</td>
<td>54.3</td>
</tr>
<tr>
<td>Prostate</td>
<td>98.0</td>
<td>93.9</td>
<td>101.4</td>
</tr>
<tr>
<td>Kidney</td>
<td>74.8</td>
<td>82.7</td>
<td>91.3</td>
</tr>
<tr>
<td>Bladder</td>
<td>77.1</td>
<td>76.0</td>
<td>79.7</td>
</tr>
<tr>
<td>Pancreas</td>
<td>9.3</td>
<td>11.4</td>
<td>17.0</td>
</tr>
<tr>
<td>Gallbladder and biliary tract</td>
<td>-</td>
<td>29.0</td>
<td>46.0</td>
</tr>
<tr>
<td>Non-Hodgkin’s lymphoma</td>
<td>72.0</td>
<td>63.1</td>
<td>72.3</td>
</tr>
<tr>
<td>Cervix</td>
<td>65.8</td>
<td>79.8</td>
<td>84.5</td>
</tr>
<tr>
<td>Ovary</td>
<td>47.6</td>
<td>64.0</td>
<td>66.2</td>
</tr>
<tr>
<td>Central nervous system</td>
<td>32.9</td>
<td>41.4</td>
<td>83.1</td>
</tr>
</tbody>
</table>

According to the Health Insurance Review and Assessment Service in 2018, Samsung Medical Center was recognized as the center of excellence in all areas of patient evaluation, including drug administration and treatment, physician service, and nursing service.

<table>
<thead>
<tr>
<th>Overall</th>
<th>SMC</th>
<th>Tertiary general hospital</th>
<th>General hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>88.3%</td>
<td></td>
<td>84.1%</td>
<td>82.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drug Administration and Treatment</th>
<th>SMC</th>
<th>Tertiary general hospital</th>
<th>General hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>84.2%</td>
<td></td>
<td>82.9%</td>
<td>81.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physician Service</th>
<th>SMC</th>
<th>Tertiary general hospital</th>
<th>General hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>80.9%</td>
<td></td>
<td>82.1%</td>
<td>82.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nursing Service</th>
<th>SMC</th>
<th>Tertiary general hospital</th>
<th>General hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.2%</td>
<td></td>
<td>88.2%</td>
<td>87.5%</td>
</tr>
</tbody>
</table>

LIVER CANCER CENTER

The Liver Cancer Center provides liver cancer care by developing the best therapeutic modalities for patients with primary liver cancer.

- We provide personalized therapy through patient-centered multidisciplinary treatment.
- Our expertise and experiences have shown world-class outcomes in all areas of liver cancer care.
Introduction

Medical faculties of the Liver Cancer Center are active in liver cancer research, treatment, and development of novel medical device. World-class treatment and research have been performed in all areas including liver resection, liver transplantation, local ablation therapy, trans-arterial chemoembolization, external beam radiation therapy, and systemic treatment.

Areas of Care
Primary liver cancer

Advantages

Personalized Therapy
- Personalized therapy through multidisciplinary approach

Fast Track Process
- Prompt linkage from diagnosis to treatment

Leading Minimally Invasive Treatment
- Leading advanced interventional treatments such as local ablation therapy, laparoscopic surgery, and proton therapy

Overcoming Severe Conditions
- ABO-incompatible liver transplantation and various combination therapies for advanced liver cancer to improve survival rate and quality of life

General Information

Treatment Result

5-year Survival Rate

The 5-year relative survival rate of patients with liver cancer who were treated from our center was 54.3%, which is far beyond the survival outcomes of other institutions.

- USA¹ 2009-2015: 18.4%
- Korea² 2012-2016: 34.6%
- SMC³ 2008-2016: 54.3%

* ¹⁾Surveillance Epidemiology and End Results (SEER) (2019), ²⁾Cancer registration statistics (2018), ³⁾Samsung Medical Center Cancer patient statistics (2018)

Multidisciplinary Treatment

Personalized therapy is pursued through multidisciplinary treatment to improve treatment outcomes. Since 2016, we have been running regular multidisciplinary clinics.

- Multidisciplinary clinic (number of cases)
- Multidisciplinary tumor board (number of cases)
Treatment Result

Surgical Resection

We have extensive experiences by performing more than 400 cases of hepatic resection each year. Laparoscopic hepatectomy is being performed in more than 60% of cases, in which an increasing number of surgical volume is carried out for patients older than 70 years of age.

Liver Transplantation

The best time of liver transplantation in patients with liver cancer is determined through multidisciplinary approach. Laparoscopic surgery is performed to ensure safety of liver donors. Since ABO-incompatible liver transplantation has become possible, liver transplantation is now a more feasible treatment choice.

Proton Therapy

Since the opening of the Proton Therapy Center in 2016, the Liver Cancer Center has become the new hope for the patients with liver cancer with better treatment outcome.

- **Complete remission**
  - 69.2%

- **Partial response**
  - 17.9%

Local ablation therapy is the core of minimally invasive treatment for liver cancer. As of 2019, more than 10,000 cases of radiofrequency ablation (RFA) have been performed in the Liver Cancer Center. With our extensive experiences and expertise for more than 20 years, we are the leading hospital in RFA therapy.

- **Radiofrequency Ablation (RFA)**
  - RFA (cumulative cases)

Liver transplantation(cases)

ABO-incompatible liver transplantation(%)

Laparoscopic surgery for living donors(%)
Transarterial embolization

Depending on the characteristics of the tumor, various transarterial embolization modalities are performed, including the conventional transarterial chemoembolization (cTACE), drug-eluting bead transarterial chemoembolization (DEB-TACE), and yttrium-90 radioembolization. Combined treatment with RFA or external radiotherapy is increasingly being performed.

Quality Management

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.

Treatment Result

- **Total Number of Transarterial Embolization Cases**
  - 2012: 2,513
  - 2013: 2,339
  - 2014: 2,170
  - 2015: 1,834
  - 2016: 1,863
  - 2017: 1,867
  - 2018: 1,840

- **Number of DEB-TACE Cases**
  - 2012: 72
  - 2013: 85
  - 2014: 39
  - 2015: 3
  - 2016: 23
  - 2017: 25
  - 2018: 45

- **Number of Radioembolization Cases**
  - 2012: 4
  - 2013: 4
  - 2014: 6
  - 2015: 7
  - 2016: 15
  - 2017: 31

※ 2nd Appropriateness Evaluation Report for Liver Cancer Treatment from Health Insurance Review and Assessment Service (June 2018), (C22.0 Liver cell carcinoma, C22.1 Intrahepatic bile duct carcinoma, C78.7 Secondary malignant neoplasm of liver and intrahepatic bile duct)
The Brain Tumor Center provides comprehensive care using advanced technologies by the best medical faculties in Korea.

- We performed the greatest number of procedures and surgeries.
- We deliver personalized care by integrating clinical practice and research.

Introduction

The brain tumor strives to deliver personalized care by combining clinical application and research for intractable brain tumors. We provide patients with advanced treatments by allowing them to participate in cutting-edge clinical trials. We aim to continuously develop and apply advanced treatment methods as promptly as possible.

Areas of Care
- Brain tumor, pituitary tumor, skull base tumor, malignant brain tumor, metastatic brain tumor

Advantages

Largest Number of Surgical Cases
- 10,000 cases of gamma knife radiosurgery in 2017 since its introduction in 2001
- Introduction of gamma knife ICON model (first in Asia)

Various Brain Tumor Clinics
- Brain Tumor Clinic
- Pituitary Tumor Clinic
- Neuroendoscopy Clinic
- Skull Base Clinic

Intraoperative Navigation System
- Accurate localization of tumor using MRI taken just before surgery

Neurophysiological Monitoring
- Real-time intraoperative monitoring of the brain and nervous system to minimize postoperative complications
Treatment Result

The 5-year relative survival rate of patients treated at the Brain Tumor Center is 83.1%, which is far higher than the survival rate worldwide.

As of 2017, we had performed a total of 10,000 cases since the first gamma knife radiosurgery operation in 2002. Patients with metastatic brain tumor consisted of 60% of the total brain tumor treatment cases.

We proposed a novel, targeted therapeutic modality using a tumor spheroid. By analyzing the genome-drug interaction among large-size tumor spheroids, we expect to see prolongation of patient survival as well as a substantial improvement in quality of life.

Research

We proposed a novel, targeted therapeutic modality using a tumor spheroid. By analyzing the genome-drug interaction among large-size tumor spheroids, we expect to see prolongation of patient survival as well as a substantial improvement in quality of life.

More Information

Verification of 2016 WHO classification of central nervous system tumors
The Brain Tumor Center of Samsung Comprehensive Cancer Center reclassified “intracranial solitary fibrous tumor” and “hemangiopericytoma” into one disease by pathology. From clinical outcomes, we found that the 2016 WHO classification of central nervous system tumors was better at predicting the prognosis of the two tumors than the previous classification system.
Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.

Quality Management

Reoperation Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Surgical Cases</th>
<th>Reoperation Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1,010</td>
<td>4.2%</td>
</tr>
<tr>
<td>2017</td>
<td>1,079</td>
<td>3.7%</td>
</tr>
<tr>
<td>2018</td>
<td>1,221</td>
<td>3.4%</td>
</tr>
</tbody>
</table>

Reoperation Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Discharged Patients</th>
<th>Reoperation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1,992</td>
<td>4.2%</td>
</tr>
<tr>
<td>2017</td>
<td>2,489</td>
<td>4.1%</td>
</tr>
<tr>
<td>2018</td>
<td>2,954</td>
<td>5.3%</td>
</tr>
</tbody>
</table>

Readmission Rate within 30 Days

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Discharged Patients</th>
<th>Readmission Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2,954</td>
<td>4.1%</td>
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<td>1.2%</td>
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The Colorectal Cancer Center provides the best care through its cutting-edge technology. We strive to attain the highest level of patient satisfaction with our incessant endeavor for optimal diagnosis and surgery.

• We improve the treatment outcome by actively introducing the newest regimen.
• We run various programs to improve the patients’ quality of life.
Introduction

The Colorectal Cancer Center has improved its treatment outcome by actively introducing high-tech treatment modalities such as robotic surgery, targeted therapy, proton therapy, and minimally invasive surgery. All departments use the common protocol based on the international guidelines to provide standardized treatment.

General Information

Areas of Care
- Colon cancer, intractable colon cancer, hereditary colon cancer, hereditary nonpolyposis colorectal cancer, rectal cancer.

Largest Number of Surgical Cases

- 01: 100 cases in 2019 since the introduction of single-port robotic surgery earlier in the year

Targeted Therapy

- 02: Targeted therapy by analyzing the oncogenes

Protocol Standardization

- 03: Best treatment outcome by practicing standardized protocol

Multidisciplinary Treatment

- 04: Best treatment option determined among various specialists for serious cases

Fast Track

- 05: One-stop service which includes testing for diagnosis, results confirmed, and treatment chosen

Program for Quality of Life

- 06: Program for bowel movement management in patients with rectal cancer

Advantages

- Minimally invasive surgery (%)
  - Open surgery + minimally invasive surgery (cases)

Treatment Result

5-year Survival

- USA\(^1\): 64.4%
- Korea\(^2\): 75.9%
- SMC\(^3\): 92.6%

\(^1\) Surveillance Epidemiology and End Results (SEER) (2019), \(^2\) Cancer registration statistics (2018), \(^3\) Samsung Medical Center Cancer patient statistics (2018)

Minimally Invasive Surgery

In 2017, we performed a cumulative number of 10,000 minimally invasive surgery cases for colorectal cancer. Among the total number of colon cancer surgery, laparoscopic colon resection consisted of 87%.

- Open surgery + minimally invasive surgery (cases)
  - Minimally invasive surgery (%)
The Colorectal Cancer Center has been performing robotic surgery from 2008. In particular, in March 2019, da Vinci SP (Single-Port) robotic surgical equipment was introduced for colon and rectal surgery for the first time in Korea, which is anticipated to open “a Turning point for Scarless surgery”.

Robotic Surgery

In 2015, the Colorectal Cancer Center opened Korea’s first “Bowel Movement Management Program for Rectal Cancer Patients” to help patient recovery. Soon after surgery, we provide bowel movement evaluation, intervention, and rehabilitation training on a regular basis.

Bowel Movement Management

- **Subject**: Patients who received rectal cancer surgery (lower anterior rectal resection, stomaakedown)
- **Department**: Rehabilitative Medicine
- **Contents**: Bowel movement function evaluation, exercise training, biofeedback treatment, etc.
- **Training Material**: Information booklet for the healthy bowel movement of rectal cancer patients and postsurgical exercise video clip

In 2015, the Colorectal Cancer Center opened Korea’s first “Bowel Movement Management Program for Rectal Cancer Patients” to help patient recovery. Soon after surgery, we provide bowel movement evaluation, intervention, and rehabilitation training on a regular basis.

- **Subject**: Patients who received rectal cancer surgery (lower anterior rectal resection, stomaakedown)
- **Department**: Rehabilitative Medicine
- **Contents**: Bowel movement function evaluation, exercise training, biofeedback treatment, etc.
- **Training Material**: Information booklet for the healthy bowel movement of rectal cancer patients and postsurgical exercise video clip

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.

Quality Management

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Surgical Cases</th>
<th>Reoperation Rate (%)</th>
<th>Readmission Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>156</td>
<td>7%</td>
<td>0.8%</td>
</tr>
<tr>
<td>2016</td>
<td>286</td>
<td>19%</td>
<td>0.8%</td>
</tr>
<tr>
<td>2017</td>
<td>425</td>
<td>22%</td>
<td>1.5%</td>
</tr>
<tr>
<td>2018</td>
<td>502</td>
<td>23%</td>
<td>1.3%</td>
</tr>
<tr>
<td>2019</td>
<td>664</td>
<td>27%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Discharged Patients</th>
<th>Reoperation Rate (%)</th>
<th>Readmission Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2,034</td>
<td>1.6%</td>
<td>0.5%</td>
</tr>
<tr>
<td>2017</td>
<td>2,074</td>
<td>1.7%</td>
<td>0.9%</td>
</tr>
<tr>
<td>2018</td>
<td>2,104</td>
<td>1.5%</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>30-day Postoperative Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1.7%</td>
</tr>
<tr>
<td>2017</td>
<td>1.9%</td>
</tr>
<tr>
<td>2018</td>
<td>1.7%</td>
</tr>
</tbody>
</table>
The Head and Neck Cancer Center pursues the highest possible cure rate and the best quality of life for our patients.

- We treat more than 10% of newly registered head and neck cancer patients in Korea.
- We provide comprehensive multimodal treatment for intractable and advanced-stage cancer cases.

**Introduction**

The Head and Neck Cancer Center takes charge of treating more than about 10% of newly registered head and neck cancer patients in Korea. As one of the Korean hospitals that provide diagnosis and treatment most frequently for head and neck cancer patients, we lead head and neck cancer care in Korea.

**Areas of Care**

- Pharyngeal cancer, oral cancer, laryngeal cancer, salivary gland cancer, nasal cavity and paranasal sinus cancers

**Advantages**

1. Multidisciplinary, personalized treatment for severe and intractable head and neck cancer cases
2. Minimally invasive surgery, including robotic surgery, endoscopy, laser surgery
3. On-site reconstruction, better functional preservation, and restoration of anatomy during surgical resection
4. Improving treatment efficacy and minimizing adverse effects

**Specialized Treatment**

**High-tech Diagnosis and Treatment**
The 5-year relative survival rate of patients with oral and pharyngeal cancer treated at the Head and Neck Cancer Center is 79.1%, which is far higher than the average worldwide.

The 5-year relative survival rate of laryngeal cancer patients treated in the Head and Neck Cancer Center is 85.8%, which also outperforms other hospitals.

In 2016, 10.1% of head and neck cancer patients in Korea visited our center. Patients who visited Samsung Comprehensive Cancer Center showed the following proportions: 15% oral, 14% nasal cavity, 11% salivary gland, 9% of pharyngeal, and 8% laryngeal cancers.

When we analyzed our patients diagnosed with head and neck cancer, pharyngeal cancer and oral cancer increased in the last few years.
The center provides multimodal treatment to 46% of our patients.

Number of Patients Treated

The Head and Neck Cancer Center treats about 680 cancer patients every year. In addition to early-stage disease, the center provides specialized treatment for patients with severe, intractable, and advanced-stage cancers. Since the introduction of proton therapy in 2016, patients treated with the therapy have increased.

Treatment Result

Quality Management

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.

Quality Management

<table>
<thead>
<tr>
<th>Number of Surgical Cases</th>
<th>Reoperation Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>613</td>
<td>3.4%</td>
</tr>
<tr>
<td>650</td>
<td>4.8%</td>
</tr>
<tr>
<td>658</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Discharged Patients</th>
<th>Readmission Rate within 30 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>723</td>
<td>1.0%</td>
</tr>
<tr>
<td>805</td>
<td>2.7%</td>
</tr>
<tr>
<td>926</td>
<td>2.5%</td>
</tr>
</tbody>
</table>
The Gynecologic Cancer Center is currently participating in multinational (13 countries) and multi-institutional clinical trials. We strive to develop advanced treatment methods by better understanding the mechanism of gynecologic cancer and drugs at the molecular level.

**Introduction**

**General Information**

The Gynecologic Cancer Center is currently participating in multinational (13 countries) and multi-institutional clinical trials. We strive to develop advanced treatment methods by better understanding the mechanism of gynecologic cancer and drugs at the molecular level.

**Advantages**

**Best Performance**

- More than 335 ovarian cancer surgeries per year (highest in Korea)
- Pioneering Research
  - New target discovery
  - Leading personalized care

**Multidisciplinary Clinic**

- Multidisciplinary Clinic provides direct care for patients with severe gynecologic cancer

**Specialized Clinics**

- Early Ovarian Cancer Detection Clinic
- Clear Cell Ovarian Cancer Clinic
- Multidisciplinary Clinic provides direct care for patients with severe gynecologic cancer

**Areas of Care**

- Ovarian / tubal cancer, primary peritoneal cancer, endometrial cancer, uterine sarcoma, cervical / vulvar / vaginal cancer, gestational trophoblastic tumors including choriocarcinoma

The Gynecologic Cancer Center provides the optimal care through systematic cooperation among all medical faculties. With the motto, “The First, The Best”, we are leading in research to bring reality into practice.

**Areas of Care**

- Ovarian / tubal cancer, primary peritoneal cancer, endometrial cancer, uterine sarcoma, cervical / vulvar / vaginal cancer, gestational trophoblastic tumors including choriocarcinoma
5-year Survival, Cervical Cancer

The 5-year relative survival rate of patients treated in the Gynecologic Cancer Center is 84.5%, an outcome that is far better than hospitals in both domestic and international locations.

5-year Survival, Ovarian Cancer

Ovarian cancer is generally difficult to treat, because it is often found in the late stages. Because of this nature, it remains one of the most challenging malignant conditions affecting women. Our center has long fought to tackle ovarian cancer, and we were able to attain the 5-year relative survival rate in this patient population at 66.2%.

Registered Ovarian Cancer Patients

In 2016, there were 2,630 newly diagnosed ovarian cancer patients in Korea, which had been increasing for almost two decades. 12% of the patients, numbered more than 300, are treated from our center every year.

Ovarian Cancer Surgical Volumes

As the patients increased in number over the years, so did the number of surgical cases. By performing about 335 cases of surgery every year, we lead the country in surgical volume for ovarian cancer.

* Surveillance Epidemiology and End Results (SEER) (2019), † Cancer registration statistics (2018), ‡ Samsung Medical Center Cancer patient statistics (2018)
**Quality Management**

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Surgical Cases</th>
<th>Reoperation Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>788</td>
<td>2.2%</td>
</tr>
<tr>
<td>2017</td>
<td>917</td>
<td>1.2%</td>
</tr>
<tr>
<td>2018</td>
<td>996</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Discharged Patients</th>
<th>Readmission Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>4,108</td>
<td>1.0%</td>
</tr>
<tr>
<td>2017</td>
<td>4,466</td>
<td>1.4%</td>
</tr>
<tr>
<td>2018</td>
<td>5,051</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

**GENITOURINARY CANCER CENTER**

The Genitourinary Cancer Center will lead the future by rewriting the history of genitourinary cancer care. It provides the best patient care based on our expertise in the field and our understanding of most updated treatment guidelines.

- We pursue minimally invasive treatment to enhance the satisfaction of our patients.
- We provide the best care through our extensive clinical experiences and multidisciplinary approaches.

The Genitourinary Cancer Center is dedicated to providing the best patient care based on our expertise in the field and our understanding of most updated treatment guidelines.
Introduction

The Genitourinary Cancer Center provides the best diagnosis and treatment based on the best medical faculty and high-tech medical equipment. Through multidisciplinary treatment, we draw the best treatment results and actively perform robotic laparoscopic surgery to improve the patients’ quality of life.

Areas of Care
- Prostate cancer, kidney cancer, bladder cancer, testicular cancer, penile cancer, etc.

Advantages

Prostate Cancer
- MRI-guided biopsy / comprehensive biopsy of perineal region / biopsy under sedation
- More than 3,500 cumulative cases of robotic surgery / HIFU (local treatment possible)
- Intensity-modulated radiation therapy / proton therapy

Kidney Cancer
- More than 1,000 cases of radiofrequency therapy of kidney cancer
- More than 1,300 accumulated cases of robotic partial nephrectomy (No. 1 Korea)
- Immune check-point inhibitors

Bladder Cancer
- Multidisciplinary clinic for bladder cancer that penetrated the muscular layer
- Immune check-point inhibitors

Robotic Laparoscopic Surgery
- More than 1,000 cases of robotic laparoscopic surgery per year that puts the patient’s quality of life first

Treatment Result

5-year Survival, Prostate Cancer

<table>
<thead>
<tr>
<th>Country</th>
<th>5-year Survival Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA1 2009-2015</td>
<td>98.0%</td>
</tr>
<tr>
<td>Korea2 2012-2016</td>
<td>93.9%</td>
</tr>
<tr>
<td>SMC3 2008-2016</td>
<td>101.6%</td>
</tr>
</tbody>
</table>

5-year Survival, Kidney Cancer

<table>
<thead>
<tr>
<th>Country</th>
<th>5-year Survival Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA1 2009-2015</td>
<td>74.8%</td>
</tr>
<tr>
<td>Korea2 2012-2016</td>
<td>82.7%</td>
</tr>
<tr>
<td>SMC3 2008-2016</td>
<td>91.3%</td>
</tr>
</tbody>
</table>

5-year Survival, Bladder Cancer

<table>
<thead>
<tr>
<th>Country</th>
<th>5-year Survival Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA1 2009-2015</td>
<td>77.1%</td>
</tr>
<tr>
<td>Korea2 2012-2016</td>
<td>76.0%</td>
</tr>
<tr>
<td>SMC3 2008-2016</td>
<td>79.7%</td>
</tr>
</tbody>
</table>

Prostate cancer is continuously increasing due to Westernized diet and early screening. The 5-year relative survival rate of patients treated in the Genitourinary Cancer Center is 101.6%, a higher outcome compared to the US and other domestic hospitals.

The 5-year relative survival rate of kidney cancer patients treated in the Genitourinary Cancer Center is 91.3%, which is also much higher compared to the US and other domestic hospitals.

Cancers in the bladder by nature have high rates of recurrence. The 5-year relative survival rate of bladder cancer patients treated at the Genitourinary Cancer Center is 79.7%, which is superior to the worldwide average.

---

Robotic surgery, which is a form of minimally invasive surgery, enables a more precise surgery. It works in favor of the patient’s quality of life and preventing postoperative complications.

Robotic surgery for Kidney Cancer

Minimally invasive partial nephrectomy allows for operating on various forms of kidney cancer, including ones that are close to the main blood vessels, completely embedded in the kidney, or large in size at 4–7 cm. More than 1,300 surgical cases have been performed, with world-class surgical outcomes.

Robotic surgery of bladder cancer minimizes abdominal pain and scars. Compared to open surgery, it causes less bleeding, fewer complications, and shorter hospital stay.

Radiofrequency ablation and cryotherapy are treatment modalities reserved for patients who are reluctant to receive surgery, elderly, or whose kidney must be preserved. As of 2017, we accomplished a cumulative 1,000 cases of therapies using these methods.

Multidisciplinary Treatment

Through multidisciplinary tumor board in which doctors from six specialties participate, treatment plan is determined for the best outcome of the patient. In cases of muscle-invasive bladder cancer, we run a multidisciplinary clinic with specialists from five departments to decide whether to preserve the bladder.
Quality Management

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.

GASTRIC CANCER CENTER

The Gastric Cancer Center will open the new chapter of gastric cancer care with accurate diagnosis and the most optimal treatment. We at the Gastric Cancer Center strive to fulfill patient satisfaction.

- We proudly present the best treatment outcomes.
- We have shown the scientific benefits of “personalized cancer therapy” for the first time in the world.

- Reoperation Rate
- Readmission Rate within 30 Days
- Number of Surgical Cases
- Number of Discharged Patients

GASTRIC CANCER CENTER

Gastric Gastroenterology Hemat-Oncology Radiation Oncology Radiology Pathology Thoracic Surgery
**Introduction**

In 2016, the Gastric Cancer Center has an unprecedented 30-day postoperative mortality of zero. With our Fast Track program which allows one-stop and multidisciplinary treatment, we will provide the most prompt and comprehensive treatment possible.

---

**General Information**

**Areas of Care**
- Gastric cancer

**Advantages**

**Minimally Invasive Surgery**
- Robotic surgery and single-port laparoscopic surgery to support faster recovery of the patient

**Endoscopic Submucosal Dissection (ESD)**
- Applicable to small-sized, well-differentiated early gastric cancer

**Personalized Cancer Clinic**
- Targeted anticancer and immunotherapeutic agents by analyzing the entire genome sequence of patients with metastatic gastric cancer

**Fast Track**
- One-stop visit including diagnostic tests, confirmation of test results, and treatment plan on the same day

---

**Treatment Result**

The 5-year relative survival rate of patients treated at the Gastric Cancer Center is 87.8%, a number that is far more superior than other prestigious medical institutions around the world.

**5-year Survival, Gastric Cancer**

- **USA**
  - 2009-2015: 31.5%
- **Korea**
  - 2012-2016: 76.0%
- **SMC**
  - 2008-2016: 87.8%

---

**ESD Result**

Among ESD cases for early gastric cancer performed at the Gastric Cancer Center in 2008-2016, 92% of them were determined to be complete resection cases.

- Total ESD (cases)
- Complete Resection ESD (%)
**Treatment Result**

**Surgical Volume**

We perform more than 1,600 cases of gastric cancer surgery per year. The number of minimally invasive surgeries, including laparoscopic and robotic surgeries, has greatly increased over the past few years.

- Robotic surgery
- Laparoscopic surgery
- Open surgery

**5-year Survival, by Stage**

We collected longitudinal survival data from the patients who received gastric cancer surgery (September 1994 – December 2012). Although 5-year relative survival rates decreased as the cancer stage advanced, for early stage such as I-A, it was 96.1%.

- I-A: 96.1%
- I-B: 93.5%
- II-A: 84.9%
- II-B: 76.1%
- III-A: 66.7%
- III-B: 43.8%
- III-C: 24.9%
- IV: 10.1%

*Based on AJCC 7th Staging*

**Research**

In 2019, we provided scientific evidence to show clinical efficacy of “personalized cancer therapy” based on the genome analysis for the first time in the world. Based on genomic and proteomic data, targeted chemotherapy was administered to patients with metastatic gastric cancer. We observed an increase of median survival of three months. As immunotherapy has become feasible in recent years, we expect to deliver a variety of personalized therapy in near future.
Quality Management

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.

30-day Postoperative Mortality

Days of Hospitalization

- 4th Appropriateness Evaluation Report for Gastric Cancer Treatment from Health Insurance Review and Assessment Service (May 2019)

Reoperation Rate (%)

Readmission Rate within 30 Days

BREAST CANCER CENTER

The Breast Cancer Center is a leader in setting a new paradigm for breast cancer care. In addition to providing cutting-edge diagnostic technology and treatment plan, we are committed to supporting mental health of our patients.

- We are proud to present the best treatment outcomes.
- We offer the utmost personalized care through multidisciplinary approach.
The Breast Cancer Center provides personalized care through patient-centered multidisciplinary approach. With extensive experience in breast cancer, we are at the forefront of treating early and advanced breast cancer, young women’s breast cancer, and hereditary breast cancer. We also treat patients with gestational, recurrent, metastatic, refractory, and male breast cancers.

**5-year Survival**

- USA³ 2009-2015: 89.8%
- Korea² 2012-2016: 92.7%
- SMC¹ 2008-2016: 95.2%

*¹⁾Surveillance Epidemiology and End Results (SEER) (2019), ²⁾Cancer registration statistics (2018), ³⁾Samsung Medical Center Cancer patient statistics (2018)

**Young Breast Cancer Clinic**

Young Breast Cancer Clinic (YBC) offers multidisciplinary care to provide early diagnosis and treatment for high-risk breast cancer patients under the age of 40. We are also committed to supporting family planning after the completion of treatment.

- Breast Cancer Patients in Korea (39 years old or younger) (person)
- New Breast Cancer Patients of SMC (40 years old or younger) (person)

*Based on new disease (breast cancer disease code in breast surgery division or hemato-oncology division) / National Cancer Registry information*
The number of patients undergoing breast cancer surgery continues to increase. We performed 2,670 cases of breast cancer surgery in 2018, of which partial mastectomy was accounted for 63%, and 34% for total mastectomy. We perform oncoplastic surgery to remove tumors safely and maximize cosmetic benefits.

The number of patients undergoing total mastectomy and concurrent breast reconstruction is on the rise. More than 40% of patients undergoing total mastectomy are undergoing concurrent breast reconstruction.

The Breast Cancer Center is actively conducting a variety of studies that can help patients in all aspects of care in breast cancer.

“Young PEARL” study
- Research of advanced treatment method for premenopausal metastatic breast cancer
- Announced at ASCO 2019 and published in Lancet Oncology
- Established advanced treatment guidelines tailored to Asian breast cancer characteristics, reflecting the characteristics of patients in Korea with higher proportion of premenopausal patients
- Cooperation with 14 medical institutions in Korea between 2015 and 2018
- The Young PEARL study found that breast cancer progression free survival in new therapies increased by nearly 40% (14.4 months → 20.1 months) compared to patients receiving conventional chemotherapy alone. Hand-and-foot syndrome, a common side effect of conventional chemotherapy, was significantly reduced with advanced treatment. We acquired clinical evidence on advanced treatments for metastatic breast cancer in Korea

We offer a wide range of education to respond to patients’ questions and concerns, from diagnosis to treatment, and returning to daily life.

Educational Curriculum
- Understanding breast cancer treatment process
- Education after breast cancer surgery
- Life management after breast cancer treatment
- Meeting with other breast cancer survivors
- Untold Stories about Breast Cancer, etc.
Quality Management

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Surgical Cases</th>
<th>Reoperation Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2,489</td>
<td>1.4%</td>
</tr>
<tr>
<td>2017</td>
<td>2,636</td>
<td>0.3%</td>
</tr>
<tr>
<td>2018</td>
<td>2,790</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Discharged Patients</th>
<th>Readmission Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2,544</td>
<td>0.1%</td>
</tr>
<tr>
<td>2017</td>
<td>2,863</td>
<td>0.4%</td>
</tr>
<tr>
<td>2018</td>
<td>3,767</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

PANCREATOBILEARY CANCER CENTER

The Pancreatobiliary Cancer Center has been taking the role of leadership in pancreatic and biliary tract cancer care. With endless research endeavors, we develop the best diagnostic and therapeutic methods.

- We are proud to present the best clinical outcomes.
The Pancreatobiliary Cancer Center is established a patient-centered approach to systematically care for patients from diagnosis to treatment. We do this by rich clinical experiences and collaborative efforts among specialists. We put forward our best effort for early diagnosis and best treatment through endoscopic intervention and wide resection, all of which come with multidisciplinary approach.

Introduction

General Information

The Pancreatobiliary Cancer Center is established a patient-centered approach to systematically care for patients from diagnosis to treatment. We do this by rich clinical experiences and collaborative efforts among specialists. We put forward our best effort for early diagnosis and best treatment through endoscopic intervention and wide resection, all of which come with multidisciplinary approach.

Areas of Care
- Biliary tract cancer, gallbladder cancer, duodenal cancer, pancreatic cancer, ampulla of vater cancer

Advantages
1. Minimally Invasive Surgery
   - Laparoscopic surgery
   - Robotic surgery
2. ERCP
   - Pancreatic and bile ducts are directly observed using endoscopic retrograde cholangiopancreatography (ERCP) for diagnosis
3. Multidisciplinary Clinic
   - The most appropriate treatment plan is determined by specialists from 5 clinical departments
4. Fast Track
5. Clinical Research
   - Endoscopic biopsy result available within two days for suspected cancer in pancreatic and/or biliary tract
6. Proton Therapy
   - Personalized care possible by clinical research
   - Improved treatment outcome while minimizing adverse effects

Minimally Invasive Surgery

Pancreatic cancer is considered as the most tenacious form of malignancy, because it is often discovered at advanced stage. The 5-year relative survival rate of pancreatic cancer patients treated in Pancreatobiliary Cancer Center is 17.0%. Based on the high surgery success rate, we strive to improve the survival rate by actively combining surgical intervention with chemoradiotherapy.

Treatment Result

5-year Survival, Pancreatic Cancer

- USA: 9.3% (2009–2015)
- Korea: 11.4% (2012–2016)
- SMC: 17.0% (2008–2016)

5-year Survival, Gallbladder and Biliary Tract Cancer

- Korea: 29.0% (2012–2016)
- SMC: 46.0% (2008–2016)

Note:
¹⁾ Surveillance, Epidemiology, and End Results (SEER) (2019), ²⁾ Cancer registration statistics (2018), ³⁾ Samsung Medical Center Cancer patient statistics (2018)
Pancreatic cancer surgery has a large surgical scope and requires extensive operation time. Because the organ produces digestive juice, surgery is rather difficult to perform. We carry out more than 200 cases of pancreatic surgery per year.

We perform about 300 cases of gallbladder and biliary tract cancer surgery per year.

Pancreatic Cancer Surgical Cases

Quality Management

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.
LUNG AND ESOPHAGEAL CANCER CENTER

The Lung and Esophageal Cancer Center continuously improves its treatment paradigm to provide better diagnosis and treatment. We boast the best surgery results in all areas of thoracic surgery, including high-level wide resection of locally advanced tumor and minimally invasive surgery using a thoracoscope.

Introduction

The Lung and Esophageal Cancer Center performs comprehensive surgery, including a high-level wide resection of the locally advanced tumor and minimally invasive surgery using a thoracoscope. Recently, “molecular targeted therapy” and “immunotherapy” that manifest pharmacological effects by blocking certain molecular pathways and unleashing the immune system against cancer, respectively, have been developed and their applications are being expanded. We lead the latest research and application in this area.

Areas of Care
- Lung cancer, esophageal cancer

Advantages
- Bronchoscopy: EBUS, Radial EBUS, Bronchoscopy, Rigid Bronchoscopy
- Best Outcome: More than 1,500 cases of lung cancer surgery per year, More than 200 cases of esophageal cancer surgery per year
- Personalized Care: Development of molecular-target therapy through clinical research, Establishment of personalized care through patient-centered multidisciplinary treatment
- High-tech Radiation Therapy: 3D dimensional treatment, intensity modulated radiation therapy, tomotherapy, stereotactic body radiation therapy, and proton therapy

General Information

LUNG AND ESOPHAGEAL CANCER CENTER

The Lung and Esophageal Cancer Center continuously improves its treatment paradigm to provide better diagnosis and treatment. We boast the best surgery results in all areas of thoracic surgery, including high-level wide resection of locally advanced tumor and minimally invasive surgery using a thoracoscope.
Treatment Result

5-year Survival, Lung Cancer

The 5-year relative survival rate of patients treated at the Lung and Esophageal Cancer Center is 48.3%. We are ranked the best in diverse categories, such as low postoperative recurrence and death rates, short hospital stay, and low coast of surgery.

![Survival Rate Graph](image)

5-year Survival, Esophageal Cancer

The 5-year relative survival rate of esophageal cancer patients treated is 57.2%, a figure that is much better than other cancer hospitals in the world.

![Survival Rate Graph](image)

Surgical Volume, Primary Non-Small Cell Lung Cancer (NSCLC)

The Lung and Esophageal Cancer Center performs 1,300–1,400 cases of radical surgery per year. The proportion of minimally invasive surgery (video-assisted thoracic surgery) is greater than 70%.

- Minimally Invasive Surgery (cases)
- Open Chest Surgery (cases)

5-year Survival, Primary Non-Small Cell Lung Cancer (NSCLC)

The 5-year relative survival rate of primary non-small cell lung cancer (NSCLC) surgery is 73.3%. When radical surgery was first performed on patients at TNM Stage I, the 5-year relative survival rate reached 85.5%.

![Survival Rate Graph](image)

### Table: Overall Survival in NSCLC

<table>
<thead>
<tr>
<th>Stage</th>
<th>Number at risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1168</td>
</tr>
<tr>
<td>II</td>
<td>7670</td>
</tr>
<tr>
<td>III</td>
<td>7165</td>
</tr>
<tr>
<td>IV</td>
<td>5329</td>
</tr>
<tr>
<td>V</td>
<td>3556</td>
</tr>
<tr>
<td>R</td>
<td>2579</td>
</tr>
</tbody>
</table>

### Table: Number at risk

<table>
<thead>
<tr>
<th>Stage</th>
<th>Number at risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
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</tr>
<tr>
<td>V</td>
<td>3556</td>
</tr>
<tr>
<td>R</td>
<td>2579</td>
</tr>
</tbody>
</table>
We perform more than 200 cases of radical surgery and reconstruction of esophageal cancer every year. Minimally invasive surgery using a thoracoscope or robot is performed on 25% of patients.

- Minimally Invasive Surgery (cases)
- Open Chest Surgery (cases)

The 5-year relative survival rate (1994-2017) of esophageal squamous cell carcinoma (ESCC) surgery is 56.5%. When radical surgery was performed on the patients at different stages, the survival rates were 80.4% for Stage I, 63.8% for Stage II, and 34.8% for Stage III.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Number at risk</th>
<th>5-year survival rate</th>
<th>10-year survival rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>882</td>
<td>80.4%</td>
<td>63.8%</td>
</tr>
<tr>
<td>II</td>
<td>601</td>
<td>63.8%</td>
<td>42.5%</td>
</tr>
<tr>
<td>III</td>
<td>681</td>
<td>34.8%</td>
<td></td>
</tr>
</tbody>
</table>

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.
The Blood Cancer Center aims to maintain its position as the best in Asia by providing the latest developments in diagnosis and treatment.

- We deliver the best treatment outcome using our extensive experience in hemopoietic stem cell transplantation.
- We are proud of sustaining the best treatment outcome for lymphoma in Korea.

General Information

Blood Cancer Center provides patients with the highest-level care through multidisciplinary effort. In particular, we actively try to introduce the latest drugs that are not supplied in the conventional pharmaceutical market by participating in multinational clinical trials.

Areas of Care
- Acute and chronic leukemia, lymphoma, multiple myeloma, aplastic anemia, myelodysplastic syndrome

Advantages

Leukemia
- Low death rate through a distinguished patient management system

Lymphoma
- High cure rate (5-year survival rate of B-cell ≥ 80%)
- Publication of treatment guidelines, including medical textbooks in lymphoma

Multiple Myeloma
- Strength in multidisciplinary treatment and research

Hemopoietic Stem Cell Transplantation
- Hemopoietic stem cell transplantation (homologous / autologous / cord blood)
Treatment Result

5-year Survival, Leukemia

The 5-year relative survival rate of leukemia patients who were treated at the Blood Cancer Center is 58.7%.

USA (2009-2015)

Korea (2012-2016)

SMC (2008-2016)

5-year Survival, Non-Hodgkin Lymphoma

The 5-year relative survival rate of non-Hodgkin lymphoma is 72.3%, which is comparable to the world standards.

USA (2009-2015)

Korea (2012-2016)

SMC (2008-2016)

5-year Survival, Multiple Myeloma

The 5-year relative survival rate of patients who have received multiple myeloma is 51.3%.

USA (2009-2015)

Korea (2012-2016)

SMC (2008-2016)

Hemopoietic Stem Cell Transplantation (HSCT)

We have rich experience in performing about 200 cases of HSCT per year. We work with nurses who received rigorous training in tumor, transplantation, inpatient and outpatient care, and research to provide the highest-level of nursing services.

Early Discharge

We provide high quality medical care based on the standard guideline. The expected duration of hospitalization for one treatment cycle in blood cancer patient is 12-13 days.
Quality Management

Each year, the center evaluates the quality of clinical services to improve quality of care and ensure a safe clinical environment.

RARE CANCER CENTER

The Rare Cancer Center provides the integrated solution for rare cancer care. We continue to provide the best research and treatment at the frontline of rare cancer care in Korea.

- We treat various types of cancer.
- We provide patients with the most optimal treatment through a multidisciplinary approach.

RARE CANCER CENTER
Introduction

The Rare Cancer Center is focusing on the treatment of rare cancers that are often intractable and have low incidence rates. Because there are numerous types, diagnosis is often difficult. We do our best to treat rare cancers through systematic multidisciplinary treatment among medical faculties.

Multidisciplinary Treatment

The Rare Cancer Center leads accurate diagnosis and prompt treatment through systematic, multidisciplinary treatment by specialists of different departments.

Areas of Care
Sarcoma, melanoma, neuroendocrine tumor, gastrointestinal stromal tumor, etc.

Clinical Trial

01

• Active clinical trials applying new drugs and provision of the latest treatment

Multidisciplinary

02

• Most optimal treatment plan determined specialists of various fields for patients whose treatment decision is often difficult

Advantages

Clinical Trial

01

Subject
Confirmed sarcoma patient

Schedule
Monday

Treatmen type
Outpatient / multidisciplinary treatment

Characteristics
Diagnosis, treatment guidelines, and prognosis of disease through weekly multidisciplinary tumor board for patients whose treatment decision is clinically difficult

Melanoma Clinic

Subject
Suspected/confirmed melanoma patient

Schedule
Wednesday

Treatmen type
Outpatient treatment

Characteristics
Outpatient treatment for melanoma diagnosis and treatment. Joint treatment system among medical departments on the same day

Neuroendocrine Tumor Clinic

Subject
Confirmed neuroendocrine tumor patient

Schedule
Regularly

Treatmen type
Outpatient / multidisciplinary treatment

Characteristics
Accurate and prompt diagnosis and treatment. Quality management of life through diet management, and stress and pain for symptom relief

Gastrointestinal Stromal Tumor Clinic

Subject
Gastrointestinal stromal tumor patient that requires multilateral treatment based on lesion location and its progress status

Schedule
Whenever necessary

Treatmen type
Outpatient/multidisciplinary treatment

Characteristics
Reduced number of visits to the hospital. Accurate diagnosis and proper treatment at the right timing

Departments

Department of Hematology and Oncology, Division of Gastroenterology, Department of Gastrointestinal Surgery, Department of Neurosurgery, Department of Plastic Surgery, Department of Orthopedic Surgery, Department of Urology, Department of Dermatology, Department of Radiation Oncology, Department of Pathology, Department of Radiology
The Proton Therapy Center opens the new chapter of cancer treatment through next-generation radiation therapy that has overcome the limitations of the traditional X-ray radiation therapy.

+ We deliver new hope with high-tech proton therapy.

Introduction

The Proton Therapy Center provides the high-tech next-generation radiation therapy. Using Bragg peak (a phenomenon that when radiation penetrates normal tissue and reaches tumor, a great amount of energy is deposited in cancer cells to kill them, after which the energy rapidly dissipates), which is a unique characteristic of proton, the accuracy and effect of treatment is improved, but adverse effects are minimized.

General Information

- Reduced Risk of Adverse Effects and Secondary Tumor
- Safe Re-irradiation
- Improved Treatment Effects

Advantages

Treatment benefit is increased, but adverse effects are minimized.

Comparison of dose distribution between X-ray and proton therapy for lung cancer
Introduction

We provide accurate treatment through innovative technology and personalized treatment based on the patients’ needs.

Personalized treatment based on the characteristics of patients
1. We present the most optimal treatment method based on patient status

<table>
<thead>
<tr>
<th>Wobbling</th>
<th>Scanning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate for treatment of organ or large</td>
<td>Appropriate for tumors requiring highly</td>
</tr>
<tr>
<td>tumors that moves along with respiration</td>
<td>precise treatment due to densely located</td>
</tr>
<tr>
<td></td>
<td>normal organs adjacent to the tumors.</td>
</tr>
</tbody>
</table>

2. We use the customized block and compensator by selectively manufacturing them.

3. Radiation dose is accurately delivered according to respiration cycle when actual treatment is performed through respiratory-gated radiation therapy.

Accurate treatment using high technology
1. Intensity-modulated proton therapy is available. Therefore, more rapid and precise treatment can be provided compared with spot scanning method.

2. By using cone beam CT to proton therapy for the first time in Korea, highly accurate proton therapy can now be performed.

3. We adopted multileaf collimator that can change the beam shape rapidly depending on the tumor. By using this, advanced methodology of treatment is being under development for the saving of treatment time and more effective protection of normal tissue.

Treatment Result

The number of patients who received proton therapy has been increasing. About 50 patients visit for treatment every day. The most common cancer types for proton therapy are liver cancer (23%), head and neck cancer (20%), and lung cancer (14%).

Proton Therapy by Cancer Type

At 3 months after the completion of proton therapy for the patients with non-metastatic hepatocellular carcinoma, tumors completely disappeared in 70% of patients. For patients who were not appropriate for the standard local therapies such as ablation or surgery, proton therapy was very beneficial as an alternative modality. In particular, because successful results included a tumor with a size greater than 10 cm that could not be dealt with X-ray radiation therapy, it is proved that the size of tumor is not a concern in proton therapy.

Proton Therapy for Liver Cancer Type

<table>
<thead>
<tr>
<th>Tumor change</th>
<th>Extinction</th>
<th>Size reduction</th>
<th>No change</th>
<th>Size increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>317</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>599</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>765</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019(F)</td>
<td>875</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MRI before proton therapy
MRI after proton therapy
When radiation therapy is performed on lung cancer patients with underlying idiopathic pulmonary fibrosis (IPF), the risk for radiation-related lung complications such as radiation pneumonia is of high concern. However, proton therapy shows an advantage in radical treatment of lung cancer patients with underlying IPF by reducing the radiation-related lung complications. When treatment outcome and toxicity of X-ray and proton therapies for those patients were compared, proton therapy resulted in a higher survival rate and a lower treatment-related death rate. Based on this result, a prospective clinical study is being conducted to evaluate the treatment outcome and the quality of life after the proton therapy for the lung cancer patients with poor lung function.

When cerebrospinal irradiation (CSI) is performed on pediatric cancer patients, the impact on the healthy brain is a concern. In such cases, proton therapy shows advantages in radiation protection for the brain compared to X-ray therapy. We are performing cerebrospinal irradiation (CSI) with intensity-modulated proton therapy (IMPT) using the line-scanning method which is unique in the world, hence providing more precise and safe treatment. CSI using X-ray shows uneven radiation dose distribution and radiation exposure in wide area. Therefore, acute and chronic adverse effects might occur after the CSI using X-ray. In addition, when multiple beams were used, handling of junctions between beams could be technical obstacles. On the other hand, the CSI using IMPT resulted in excellent radiation dose distribution and minimization of radiation exposure to internal organs, so that acute and chronic sequelae could be reduced, and the quality of life could be improved after treatment. Given the present knowledge, we are performing a prospective clinical study evaluating the treatment outcome and the quality of life after the CSI with IMPT for the pediatric cancer patients.

<table>
<thead>
<tr>
<th>Classification</th>
<th>X-ray treatment(22 persons)</th>
<th>Proton therapy(8 persons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death rate caused by treatment</td>
<td>18.2%</td>
<td>0%</td>
</tr>
<tr>
<td>related lung complications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six-month survival rate</td>
<td>67.9%</td>
<td>100%</td>
</tr>
<tr>
<td>One-year survival rate</td>
<td>46.4%</td>
<td>66.7%</td>
</tr>
</tbody>
</table>

The Supportive Care Center takes a holistic approach and provides total-care for improving cancer patients’ quality of life.

- We cover the whole cancer journey from cancer prevention, diagnosis, treatment, and rehabilitation.
- We help patients and family members to fight against cancer and to improve quality of life.
The Supportive Care Center aims to improve cancer patients’ and their families’ quality of life. We provide personalized care to relieve the physical and psychological burden of the patients and family members during cancer journey. We promise to provide the best supportive care in cancer care.

**General Information**

**Introduction**

The Supportive Care Center provides what patients need through systematic cooperation among various clinics during the entire treatment process.

**Clinics**

- **Before Treatment**
  - Multidisciplinary care team evaluates patients’ condition in advance to minimize the risk and maximize clinical benefit

- **During Treatment**
  - Early management of symptoms during treatment
  - Active communication and consultation with experts

- **After Treatment**
  - Help cancer patients and their family members to fight against cancer by providing a total care service.
  - Management of healthy life after treatment completion and cure
  - Alleviating symptoms in terminal cancer patients

**Clinic** | **Care Details**
---|---
Rehabilitation Clinic | Diagnosis and treatment of symptoms and dysfunction
Survivorship Clinic | Vaccination, smoking cessation, management of chronic disease and complications, secondary cancer screening, and regular follow-ups
Cancer Pain Clinic | Cancer pain management
Palliative Care Clinic | Relief of physical symptoms and psychological and social pain for terminal cancer patients
Psycho oncology Clinic | Psychiatric symptom relief, management of insomnia, stress, anxiety, and depression
Genetic Clinic | Genetic counseling and diagnosis including family members
Dermatology Clinic | Management of cancer treatment-related skin problems
Scar Clinic | Scar prevention and management after cancer surgery

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**Smart Alert Alarm by Automatic Screening System**

01

- Personalized care by managing early symptoms via automatic alarm system to allow for multidisciplinary action

**QOL Improvement Program**

02

- Bowel Movement Management Program of Rectal Cancer Patients
- Respiratory Rehabilitation Program of Lung Surgery Patients

**Integrated Pain Management**

03

- Best pain management service through multidisciplinary approach with the Department of Family Medicine, Anesthesiology, Rehabilitation Medicine, and Psychiatry

**Specialized Counseling**

04

- Counseling on pain management, hospice/palliative care, mental health, genetics, and nutrition
The number of patients has been increasing every year after opening the Supportive Care Center in 2014.

The Supportive Care Center provides counseling on nutrition, pain management, symptom relief and improvement of the quality of life.