

DEPARTMENT OF SURGERY  
**SECTION OF TRANSPLANT SURGERY**  
TRANSPLANT SURGERY ROTATION (STX)

University Hospital  
C.S.Mott Children's Hospital  
Cardiovascular Center

House Officer I  
House Officer III  
House Officer IV  
House Officer V

Curriculum/Rotation Goals and Objectives for  
Surgery Residents

# Transplant Surgery Service

## House Officer I

**Goal:** The goal of HO I Transplant Surgery rotation is to build on the resident's overall general surgical knowledge and operative experience and provide more concentrated exposure in those clinical conditions relevant to the transplant surgery service including dialysis access, liver transplantation, renal transplantation, organ donation, and hepatobiliary malignancy.

### Learning Objectives:

#### Patient Care:

By the end of the Transplant Surgery rotation, the HO I resident will be able to:

1. Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
2. Gather essential and accurate information about their patients, especially regarding liver, kidney, and other transplant relevant procedures.
3. Suggest diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
4. Counsel and educate patients and their families, under the guidance and direction of senior residents, fellows, and faculty
5. Use information technology effectively to support patient care decisions and patient education
6. Assist and perform bedside procedures (with supervision as necessary) including paracentesis, thoracentesis, drain removal, and line removal
7. Collaborate with health care professionals, including those from other disciplines, to provide patient-focused care, with a particular attention to the multidisciplinary care of the end organ disease patient which includes interactions with hepatology, infectious disease, nephrology, dietitians, and mid-level providers from the clinic and inpatient service

#### Medical Knowledge:

By the end of the Transplant Surgery rotation, the HO I resident will be able to:

##### 1. Dialysis Access

- a. Explain the anatomy and physiology of AV graft, AV fistula and peritoneal dialysis procedures and techniques
- b. Categorize the common treatment options for end stage renal disease
- c. Delineate the intra-operative risks of AV access surgery
- d. Demonstrate safe and effective post-operative management of uncomplicated AV access and peritoneal access patients
- e. Delineate post-operative complications, both short and long term for dialysis access patients
- f. Demonstrate safe and effective management of post-operative complications, including hematoma, steal syndrome, surgical site infection, including "red flags" for notifying senior residents or faculty regarding potential need for reoperation

##### 2. Liver transplantation

- a. Explain the anatomy of the liver and mesenteric venous system
- b. List the common treatment options for end stage liver disease and portal hypertension
- c. Explain the basic anatomic techniques associated with liver transplantation
- d. Delineate the intra-operative risks of liver transplantation
- e. Demonstrate basic safe and effective post-operative management of liver transplant patients with a particular focus on bleeding, acute renal failure, and toxicity from immunosuppression medications
- f. Summarize post-operative complications, both short and long term for liver transplantation
- g. Demonstrate safe and effective initial management of post-operative complications including surgical site infection, acute renal failure, bleeding, encephalopathy, and infectious complications related to the immunosuppressed patients

### **3. Renal Transplantation**

- a. List the indications for renal transplantation
- b. List the different surgical procedures currently including deceased and living organ kidney transplantation
- c. List the relevant clinical specialties who have input in the multidisciplinary management of kidney transplant patients
- d. Describe the technique for renal transplantation
- e. Enumerate the intra-operative risks of renal transplantation
- f. Demonstrate safe and effective initial post-operative management of renal transplant patients including hypertension, diabetes, cardiac dysfunction, volume overload, electrolyte abnormalities, and immunosuppression.
- g. Explain post-operative complications of renal transportation and immunosuppression
- h. Identify post-operative complications and demonstrate safe and effective initial management
- i. Explain common indications for need for emergent reoperation on kidney transplant patients

### **4. Organ Donation**

- a. Explain in general terms differences between deceased and living donation
- b. Explain in general terms liver and kidney organ allocation policies in the United States
- c. Explain the techniques used for laparoscopic kidney donation and multi organ deceased donor procurement
- d. Explain the basic contraindications to organ donation
- e. Explain CDC high risk donation status
- f. Explain the difference between a split and whole liver allograft
- g. List the intra-operative risks of laparoscopic nephrectomy
- h. Demonstrate safe and effective post-operative management of living kidney donors
- i. Explain possible post-operative complications of living kidney donation
- j. Identify post-operative complications and demonstrate safe and effective management initial management. These conditions include surgical site infection, venous thromboembolism, bleeding, and organ dysfunction

### **5. Hepatobiliary Malignancy**

- a. Explain the liver anatomic vascular and biliary variants
- b. Explain the most common diseases presenting for possible HPB resection including primary and metastatic liver disease, benign liver disease, and biliary obstruction (benign and malignant)
- c. Explain the basic technique of open and laparoscopic hepatectomy
- d. List the intra-operative risks of both open and laparoscopic hepatectomy
- e. Demonstrate safe and effective post-operative management of hepatectomy, especially the recognition of post-operative "red flags" that indicate bleeding and the need for reoperation

## **Systems-Based Practice:**

By the end of the Transplant Surgery rotation, the HO I resident will be able to:

1. Explain the role of systems in delivering optimal health care, including how "system problems" contribute to quality problems

2. Explain how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice
3. Explain how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources
4. Practice cost-effective health care and resource allocation that does not compromise quality of care
5. Advocate for quality patient care and assist patients in dealing with system complexities
6. Collaborate with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

### **Practice-Based Learning and Improvement:**

By the end of the Transplant Surgery rotation, the HO I resident will be able to:

1. Analyze patient care experience and perform practice-based improvement activities using a systematic methodology (discussed in QI curriculum)
2. Locate, appraise, and assimilate evidence from scientific studies related to his or her patients' health problems
3. Conduct an effective literature search about a given transplant surgery topic
4. Obtain and use information about his or her own population of patients and the larger population from which their patients are drawn, including knowledge of the UNOS/OPTN databases
5. Describe/design a systematic approach to evaluate the results of one's own practice
6. Use information technology to manage information, access on-line medical information; and support self-directed education

### **Professionalism:**

By the end of the Transplant Surgery rotation, the HO I resident will be able to:

1. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development
2. Demonstrate appropriate sensitivity to the severely chronically ill patient population, and understand how their needs may be different from other patients
3. Recognize the importance of timely record keeping and its impact on the quality of transplant surgery care
4. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices
5. Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

### **Interpersonal and Communication Skills:**

By the end of the Transplant Surgery rotation, the HO I resident will be able to:

1. Create and sustain a therapeutic and ethically sound relationship with patients
2. Demonstrate and employ effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills
3. Work effectively with others as a member or leader of a health care team or other professional group
4. Demonstrate the ability to interview and evaluate the patient, especially the severely ill end-stage organ failure patient

# Transplant Surgery Service

## House Officer III

**Goal:** The goal of HO III Transplant Surgery rotation is to continue to build on the resident's overall general surgical knowledge and operative experience and provide more concentrated technical and management exposure in those clinical conditions transplant surgery service including dialysis access, liver transplantation, renal transplantation, organ donation, and hepatobiliary malignancy.

### Learning Objectives:

#### Patient Care:

By the end of the Transplant Surgery rotation, the HO III resident will be able to:

1. Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
2. Gather essential and accurate information about their patients, especially regarding liver, kidney, and other transplant relevant procedures
3. Suggest diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
4. Counsel and educate patients and their families, under the guidance and direction of the transplant surgery fellow and faculty
5. Use information technology effectively to support patient care decisions and patient education
6. Assist and teach bedside procedures including paracentesis, thoracentesis, drain removal, and line removal
7. Collaborate with health care professionals, including those from other disciplines, to provide patient-focused care, with a particular attention to the multidisciplinary care of the end organ disease patient which includes interactions with hepatology, infectious disease, nephrology, dietitians, and mid-level providers from the clinic and inpatient service

#### Medical Knowledge:

By the end of the Transplant Surgery rotation, the HO III resident will be able to:

##### 1. Dialysis Access

- a) Explain the anatomy and physiology of AV graft, AV fistula and peritoneal dialysis procedures and techniques
- b) Categorize the common treatment options for end stage renal disease
- c) Delineate the intra-operative risks of AV access surgery
- d) Demonstrate safe and effective post-operative management of uncomplicated AV access and peritoneal access patients
- e) Delineate post-operative complications, both short and long term for dialysis access patients
- f) Demonstrate safe and effective management of post-operative complications, including hematoma, steal syndrome, surgical site infection, including "red flags" for notifying senior residents or faculty regarding potential need for reoperation
- g) With careful mentorship, perform basic techniques in operative care including vascular anastomoses
- h) Explain diagnostic approaches to confirm adequate vascular capacity to accommodate an access procedure

##### 2. Liver transplantation

- a) Explain the anatomy of the liver and mesenteric venous system
- b) List the common treatment options for end stage liver disease and portal hypertension including shunt procedures and TIPS
- c) Explain the advanced anatomic techniques associated with liver transplantation including piggyback techniques, cavacavostomy, and use of venous bypass
- d) Delineate the intra-operative risks of liver transplantation
- e) Conduct a basic primary evaluation of the potential liver transplant candidate
- f) Demonstrate basic safe and effective post-operative management of liver transplant patients with a particular focus on bleeding, acute renal failure, and toxicity from immunosuppression medications
- g) Summarize post-operative complications, both short and long term for liver transplantation
- h) Demonstrate safe and effective initial management of post-operative complications including surgical site infection, acute renal failure, bleeding, encephalopathy, and infectious complications related to the immunosuppressed patients

### **3. Renal Transplantation**

- a) List the indications for renal transplantation
- b) List the different surgical procedures currently including deceased and living organ kidney transplantation
- c) List the relevant clinical specialties who have input in the multidisciplinary management of kidney transplant patients
- d) Describe the technique for renal transplantation
- e) Demonstrate safe, effective, and efficient completion of a kidney transplant venous and arterial vascular anastomosis
- f) Complete a basic ureterourostomy
- g) Enumerate the intra-operative risks of renal transplantation
- h) Demonstrate safe and effective initial post-operative management of renal transplant patients including hypertension, diabetes, cardiac dysfunction, volume overload, electrolyte abnormalities, and immunosuppression
- i) Explain post-operative complications of renal transportation and immunosuppression
- j) Identify post-operative complications and demonstrate safe and effective management
- k) Explain common indications for need for emergent reoperation on kidney transplant patients

### **4. Organ Donation**

- a) Explain in general terms differences between deceased and living donation
- b) Explain in general terms liver and kidney organ allocation policies in the United States
- c) Explain the techniques used for laparoscopic kidney donation and multi organ deceased donor procurement
- d) Demonstrate safe and effective deceased donor organ procurement including vascular control of the aorta and renal recovery (with attending surgeon guidance)
- e) Explain the basic contraindications to organ donation
- f) Explain CDC high risk donation status
- g) Explain the difference between a split and whole liver allograft
- h) List the intra-operative risks of laparoscopic nephrectomy
- i) Demonstrate safe and effective post-operative management of living kidney donors
- j) Explain possible post-operative complications of living kidney donation
- k) Identify post-operative complications and demonstrate safe and effective management initial management. These conditions include surgical site infection, venous thromboembolism, bleeding, and organ dysfunction

### **5. Hepatobiliary Malignancy**

- a) Explain the liver anatomic vascular and biliary variants
- b) Explain the most common diseases presenting for possible HPB resection including primary and metastatic liver disease, benign liver disease, and biliary obstruction (benign and malignant)
- c) Explain the basic technique of open and laparoscopic hepatectomy
- d) List the intra-operative risks of both open and laparoscopic hepatectomy
- e) Perform basic operative techniques involved in hepatectomy including the transection of

- normal hepatic parenchyma and intrahepatic vascular control
- f) Demonstrate safe and effective post-operative management of hepatectomy, especially the recognition of post-operative "red flags" that indicate bleeding and the need for reoperation

### **Systems-Based Practice:**

By the end of the Transplant Surgery rotation, the HO III resident will be able to:

1. Explain the role of systems in delivering optimal health care, including how "system problems" contribute to quality problems
2. Explain how his or her patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice
3. Explain how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources
4. Practice cost-effective health care and resource allocation that does not compromise quality of care
5. Advocate for quality patient care and assist patients in dealing with system complexities
6. Collaborate with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

### **Practice-Based Learning and Improvement:**

By the end of the Transplant Surgery rotation, the HO III resident will be able to:

1. Analyze patient care experience and perform practice-based improvement activities using a systematic methodology (discussed in QI curriculum)
2. Locate, appraise, and assimilate evidence from scientific studies related to his or her patients' health problems
3. Conduct an effective literature search about a given transplant surgery topic
4. Obtain and use information about their own population of patients and the larger population from which their patients are drawn, including knowledge of the UNOS/OPTN databases
5. Describe/design a systematic approach to evaluate the results of one's own practice
6. Use information technology to manage information, access on-line medical information; and support self-directed education

### **Professionalism:**

By the end of the Transplant Surgery rotation, the HO III resident will be able to:

1. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development
2. Demonstrate appropriate sensitivity to the severely chronically ill patient population, and understand how their needs may be different from other patients
3. Recognize the importance of timely record keeping and its impact on the quality of transplant surgery care
4. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices
5. Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

## **Interpersonal and Communication Skills:**

By the end of the Transplant Surgery rotation, the HO III resident will be able to:

1. Create and sustain a therapeutic and ethically sound relationship with patients
2. Demonstrate and employ effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills
3. Work effectively with others as a member or leader of a health care team or other professional group
4. Demonstrate the ability to interview and evaluate the patient, especially the severely ill end-stage organ failure patient

# Transplant Surgery Service

## House Officer IV

**Goal:** The goal of HO IV Transplant Surgery rotation is to continue to build on the resident's overall general surgical knowledge and operative experience and provide more concentrated technical and management exposure in those clinical conditions transplant surgery service including dialysis access, liver transplantation, renal transplantation, organ donation, and hepatobiliary malignancy.

### Learning Objectives:

#### Patient Care:

By the end of the Transplant Surgery rotation, the HO IV resident will be able to:

1. Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
2. Gather essential and accurate information about their patients, especially regarding liver, kidney, and other transplant relevant procedures
3. Suggest diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
4. Counsel and educate patients and their families, under the guidance and direction of the transplant surgery fellow and faculty
5. Use information technology effectively to support patient care decisions and patient education
6. Assist and teach bedside procedures including paracentesis, thoracentesis, drain removal, and line removal
7. Collaborate with health care professionals, including those from other disciplines, to provide patient-focused care, with a particular attention to the multidisciplinary care of the end organ disease patient which includes interactions with hepatology, infectious disease, nephrology, dietitians, and mid-level providers from the clinic and inpatient service

#### Medical Knowledge:

By the end of the Transplant Surgery rotation, the HO IV resident will be able to:

##### 1. Dialysis Access

- a. Explain the anatomy and physiology of AV graft, AV fistula and peritoneal dialysis procedures and techniques
- b. Categorize the common treatment options for end stage renal disease
- c. Delineate the intra-operative risks of AV access surgery
- d. Demonstrate safe and effective post-operative management of uncomplicated AV access and peritoneal access patients
- e. Delineate post-operative complications, both short and long term for dialysis access patients
- f. Demonstrate safe and effective management of post-operative complications, including hematoma, steal syndrome, surgical site infection, including "red flags" for notifying senior residents or faculty regarding potential need for reoperation
- g. With careful mentorship, perform basic techniques in operative care including vascular anastomoses
- h. Explain diagnostic approaches to confirm adequate vascular capacity to accommodate an access procedure

##### 2. Liver transplantation

- a. Explain the anatomy of the liver and mesenteric venous system
- b. List the common treatment options for end stage liver disease and portal hypertension including shunt procedures and TIPS
- c. Explain the advanced anatomic techniques associated with liver transplantation including piggyback techniques, cavacavostomy, and use of venous bypass
- d. Delineate the intra-operative risks of liver transplantation
- e. Conduct a basic primary evaluation of the potential liver transplant candidate
- f. Demonstrate basic safe and effective post-operative management of liver transplant patients with a particular focus on bleeding, acute renal failure, and toxicity from immunosuppression medications
- g. Summarize post-operative complications, both short and long term for liver transplantation
- h. Demonstrate safe and effective initial management of post-operative complications including surgical site infection, acute renal failure, bleeding, encephalopathy, and infectious complications related to the immunosuppressed patients

### **3. Renal Transplantation**

- a. List the indications for renal transplantation
- b. List the different surgical procedures currently including deceased and living organ kidney transplantation
- c. List the relevant clinical specialties who have input in the multidisciplinary management of kidney transplant patients
- d. Describe the technique for renal transplantation
- e. Demonstrate safe, effective, and efficient completion of a kidney transplant venous and arterial vascular anastomosis
- f. Complete a basic ureterostomy
- g. Enumerate the intra-operative risks of renal transplantation
- h. Demonstrate safe and effective initial post-operative management of renal transplant patients including hypertension, diabetes, cardiac dysfunction, volume overload, electrolyte abnormalities, and immunosuppression
- i. Explain post-operative complications of renal transplantation and immunosuppression
- j. Identify post-operative complications and demonstrate safe and effective management
- k. Explain common indications for need for emergent reoperation on kidney transplant patients

### **4. Organ Donation**

- a. Explain in general terms differences between deceased and living donation
- b. Explain in general terms liver and kidney organ allocation policies in the United States
- c. Explain the techniques used for laparoscopic kidney donation and multi organ deceased donor procurement
- d. Demonstrate safe and effective deceased donor organ procurement including vascular control of the aorta and renal recovery (with attending surgeon guidance)
- e. Explain the basic contraindications to organ donation
- f. Explain CDC high risk donation status
- g. Explain the difference between a split and whole liver allograft
- h. List the intra-operative risks of laparoscopic nephrectomy
- i. Demonstrate safe and effective post-operative management of living kidney donors
- j. Explain possible post-operative complications of living kidney donation
- k. Identify post-operative complications and demonstrate safe and effective management initial management. These conditions include surgical site infection, venous thromboembolism, bleeding, and organ dysfunction

### **5. Hepatobiliary Malignancy**

- a. Explain the liver anatomic vascular and biliary variants
- b. Explain the most common diseases presenting for possible HPB resection including primary and metastatic liver disease, benign liver disease, and biliary obstruction (benign and malignant)
- c. Explain the basic technique of open and laparoscopic hepatectomy
- d. List the intra-operative risks of both open and laparoscopic hepatectomy
- e. Perform basic operative techniques involved in hepatectomy including the transection of

- normal hepatic parenchyma and intrahepatic vascular control
- f. Demonstrate safe and effective post-operative management of hepatectomy, especially the recognition of post-operative "red flags" that indicate bleeding and the need for reoperation

### **Systems-Based Practice:**

By the end of the Transplant Surgery rotation, the HO IV resident will be able to:

1. Explain the role of systems in delivering optimal health care, including how "system problems" contribute to quality problems
2. Explain how his or her patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice
3. Explain how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources
4. Practice cost-effective health care and resource allocation that does not compromise quality of care
5. Advocate for quality patient care and assist patients in dealing with system complexities
6. Collaborate with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

### **Practice-Based Learning and Improvement:**

By the end of the Transplant Surgery rotation, the HO IV resident will be able to:

1. Analyze patient care experience and perform practice-based improvement activities using a systematic methodology (discussed in QI curriculum)
2. Locate, appraise, and assimilate evidence from scientific studies related to his or her patients' health problems
3. Conduct an effective literature search about a given transplant surgery topic
4. Obtain and use information about his or her own population of patients and the larger population from which their patients are drawn, including knowledge of the UNOS/OPTN databases
5. Describe/design a systematic approach to evaluate the results of one's own practice
6. Use information technology to manage information, access on-line medical information; and support self-directed education

### **Professionalism:**

By the end of the Transplant Surgery rotation, the HO IV resident will be able to:

1. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development
2. Demonstrate appropriate sensitivity to the severely chronically ill patient population, and understand how their needs may be different from other patients
3. Recognize the importance of timely record keeping and its impact on the quality of transplant surgery care
4. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices
5. Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

## **Interpersonal and Communication Skills:**

By the end of the Transplant Surgery rotation, the HO IV resident will be able to:

1. Create and sustain a therapeutic and ethically sound relationship with patients
2. Demonstrate and employ effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills
3. Work effectively with others as a member or leader of a health care team or other professional group
4. Demonstrate the ability to interview and evaluate the patient, especially the severely ill end-stage organ failure patient

# Transplant Surgery Service

## House Officer V

**Goal:** The goal of HO V Transplant Surgery rotation is for the resident to master basic technical aspects of renal transplantation and dialysis access surgery. In addition, the HO V resident will demonstrate mastery of the complex management of the end-organ disease patients and the basic techniques involved in the management of hepatobiliary malignancy.

### Learning Objectives:

#### Patient Care:

By the end of the Transplant Surgery rotation, the HO V resident will be able to:

1. Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
2. Gather essential and accurate information about their patients, especially regarding liver, kidney, and other transplant relevant procedures
3. Suggest diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
4. Counsel and educate patients and their families, under the guidance and direction of the transplant surgery fellow and faculty
5. Use information technology effectively to support patient care decisions and patient education
6. Teach bedside procedures including paracentesis, thoracentesis, drain removal, and line removal
7. Collaborate with health care professionals, including those from other disciplines, to provide patient-focused care, with a particular attention to the multidisciplinary care of the end organ disease patient which includes interactions with hepatology, infectious disease, nephrology, dietitians, and mid-level providers from the clinic and inpatient service

#### Medical Knowledge:

By the end of the Transplant Surgery rotation, the HO V resident will be able to:

##### 1. Dialysis Access

- a) Explain the anatomy and physiology of AV graft, AV fistula and peritoneal dialysis procedures and techniques
- b) Categorize the common treatment options for end stage renal disease
- c) Delineate the intra-operative risks of AV access surgery
- d) Demonstrate safe and effective post-operative management of uncomplicated AV access and peritoneal access patients
- e) Delineate post-operative complications, both short and long term for dialysis access patients
- f) Demonstrate safe and effective management of post-operative complications, including hematoma, steal syndrome, surgical site infection, including "red flags" for notifying senior residents or faculty regarding potential need for reoperation
- g) Perform techniques in operative care including vascular anastomoses to the normal and disease blood vessel
- h) Assess the flow through a vascular anastomosis using standard intraoperative techniques
- i) Assess the flow to an extremity distal to a vascular anastomosis
- j) Control bleeding from a vascular anastomosis safely, efficiently, and effectively
- k) Explain the role of endovascular interventions in optimizing access for patients

##### 2. Liver transplantation

- a) Explain the anatomy of the liver and mesenteric venous system
- b) List the common treatment options for end stage liver disease and portal hypertension including shunt procedures and TIPS
- c) Explain the advanced anatomic techniques associated with liver transplantation including piggyback techniques, cavacavostomy, and use of venous bypass
- d) Explain advanced anatomic considerations for the management of the liver transplant patient with liver arterial or venous occlusion
- e) Delineate the intra-operative risks of liver transplantation
- f) Conduct a primary evaluation of the potential liver transplant candidate
- g) Demonstrate basic safe and effective post-operative management of liver transplant patients with a particular focus on bleeding, acute renal failure, and toxicity from immunosuppression medications
- h) Summarize post-operative complications, both short and long term for liver transplantation
- i) Demonstrate safe and effective initial management of post-operative complications including surgical site infection, acute renal failure, bleeding, encephalopathy, and infectious complications related to the immunosuppressed patients

### **3. Renal Transplantation**

- a) List the indications for renal transplantation
- b) List the different surgical procedures currently including deceased and living organ kidney transplantation
- c) List the relevant clinical specialties who have input in the multidisciplinary management of kidney transplant patients
- d) Demonstrate competent completion of the techniques involved in renal transplantation including the vascular anastomosis to both normal and diseased artery and vein
- e) Control bleeding at the site of the vascular anastomosis in a renal transplant
- f) Complete a basic ureterostomy
- g) Enumerate the intra-operative risks of renal transplantation
- h) Demonstrate safe and effective initial post-operative management of renal transplant patients including hypertension, diabetes, cardiac dysfunction, volume overload, electrolyte abnormalities, and immunosuppression
- i) Explain post-operative complications of renal transplantation and immunosuppression
- j) Identify post-operative complications and demonstrate safe and effective management
- k) Explain common indications for emergent reoperation on kidney transplant patients

### **4. Organ Donation**

- a) Explain in advanced terms differences between deceased and living donation.
- b) Explain in advanced terms liver and kidney organ allocation policies in the United States. Explain preferential access to donate organs for patients with allosensitization.
- c) Explain the techniques used for laparoscopic kidney donation and multi organ deceased donor procurement.
- d) Complete advanced techniques of the deceased donor organ procurement including vascular control of the superior mesenteric artery, mobilization of the spleen and pancreas prior to procurement, and portal dissection in preparation for liver transplantation.
- e) Explain the basic contraindications to organ donation
- f) Explain CDC high risk donation status
- g) Explain the difference between a split and whole liver allograft
- h) List the intra-operative risks of laparoscopic nephrectomy
- i) Demonstrate safe and effective post-operative management of living kidney donors
- j) Explain possible post-operative complications of living kidney donation
- k) Identify post-operative complications and demonstrate safe and effective management initial management. These conditions include surgical site infection, venous thromboembolism, bleeding, and organ dysfunction.

### **5. Hepatobiliary Malignancy**

- a) Explain the liver anatomic vascular and biliary variants
- b) Explain the most common diseases presenting for possible HPB resection including primary and metastatic liver disease, benign liver disease, and biliary obstruction (benign and

- malignant)
- c) List the intra-operative risks of both open and laparoscopic hepatectomy
- d) Perform basic operative techniques involved in hepatectomy including the transection of normal and diseased hepatic parenchyma and intrahepatic vascular control
- e) Describe the relationship between liver function, functional recovery, and outcomes following resection
- f) Compare and contrast the multimodal approaches for the management of hepatic malignancy
- g) Demonstrate safe and effective post-operative management of hepatectomy, especially the recognition of post-operative "red flags" that indicate bleeding and the need for reoperation

### **Systems-Based Practice:**

By the end of the Transplant Surgery rotation, the HO V resident will be able to:

1. Explain the role of systems in delivering optimal health care, including how "system problems" contribute to quality problems
2. Explain how his or her patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice
3. Explain how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources
4. Practice cost-effective health care and resource allocation that does not compromise quality of care
5. Advocate for quality patient care and assist patients in dealing with system complexities
6. Collaborate with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

### **Practice-Based Learning and Improvement:**

By the end of the Transplant Surgery rotation, the HO V resident will be able to:

1. Analyze patient care experience and perform practice-based improvement activities using a systematic methodology (discussed in QI curriculum)
2. Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems
3. Conduct an effective literature search about a given transplant surgery topic
4. Obtain and use information about his or her own population of patients and the larger population from which their patients are drawn, including knowledge of the UNOS/OPTN databases
5. Describe/design a systematic approach to evaluate the results of one's own practice
6. Use information technology to manage information, access on-line medical information; and support self-directed education

### **Professionalism:**

By the end of the Transplant Surgery rotation, the HO V resident will be able to:

1. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development
2. Demonstrate appropriate sensitivity to the severely chronically ill patient population, and understand how their needs may be different from other patients
3. Recognize the importance of timely record keeping and its impact on the quality of transplant surgery care
4. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices

5. Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

**Interpersonal and Communication Skills:**

By the end of the Transplant Surgery rotation, the HO V resident will be able to:

1. Create and sustain a therapeutic and ethically sound relationship with patients
2. Demonstrate and employ effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills
3. Work effectively with others as a member or leader of a health care team or other professional group
4. Demonstrate the ability to interview and evaluate the patient, especially the severely ill end-stage organ failure patient