Liver is a large organ and is considered to be the “metabolic factory of the human body. Naturally liver is a” paired organ” composed of right and left lobes joined together. With advanced surgical techniques, the liver can be divided into two separate and functionally independent units and this is the basis for living donor liver transplantation.

Living liver donation is possible because the liver has the ability to regenerate. Regeneration of the liver happens over a period of about six to eight weeks. The transplanted liver will also grow or shrink to an appropriate size for the recipient.

The first living donor liver transplant in 1988 was performed in Brazil of a child who received part of an adult liver. In 1994 the first Adult to Adult Living Liver Donor Transplant was performed in Japan. More than 10,000 living donor liver transplants have been performed so far across the globe. The living donor liver transplantation is an established form of treatment for patients with end stage liver disease.

Who can become a donor?

- A blood related or a spouse who share compatible blood group with the patient.
- Between the ages of 18 and 50 years.
- In good health, no major health problem.
- Voluntarily, altruistic donation.

Living donation is not possible for all the donors due to medical and technical reasons.

Confidentiality

Donors will be given information regarding the recipients liver disease and the possibility of recurrence of the original disease. Recipients will not be given information regarding the donors test results or the reason why a donor is not suitable.

How can I become a donor?

If you are considering donating part of your liver to a relative or friend it is essential that:

- Your liver is suitable for the recipient
- The risk to your own health is minimal
- No financial or other pressure is being put on you to donate
- Reason for donation must be voluntary and altruistic

You should contact the transplant coordinator to note your interest in becoming a donor. After some initial information you will be given an information folder. We will also request that you have your blood group checked before your first clinic appointment.

Do I need to be related to the recipient?

It is not possible to be a donor if you are not related to the recipient. The Human Tissue Authority protocols and guidelines have to be met. "It is a criminal offence to carry out a transplant operation between two living people if the conditions of the HT Act are not met. This includes valid consent being given by the donor and the recipient"

What are the results for living donor liver transplants?

Living donor liver transplantation is now an established form of treatment for children and adults with end stage liver disease with 85% of those who receive a liver transplant from a living donor are alive at one year after their transplant. This is comparable with the patients who receive a transplant from cadaveric donors.

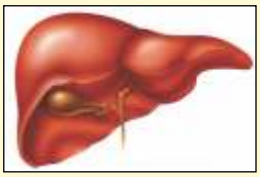
What are the advantages of living donor transplantation?

There are a number of potential advantages of having a living donor; however the most important is that the recipient does not have to wait many months for a cadaveric liver due to the scarcity of cadaveric donors in Pakistan. If a recipient has a suitable living donor they may avoid becoming much sicker

during a stressful waiting period. For a number of patients their health may deteriorate over time and they may become unsuitable for transplant. For example patients with hepatocellular carcinoma may have disease progression during the waiting time.

Theoretically there is less risk of rejection due to the genetic similarity in the donor to recipient graft. Surgery can be electively planned and the potential recipient optimized to the best of health where a potential living donor is available. The quality of a living donor liver may be better than that of a cadaveric liver, as the living donor will have undergone a strict assessment prior to being accepted as a donor. Preservation time for a living donor is much shorter than the preservation time for a cadaveric donor or non heart-beating donor; this also contributes to a better quality liver.

What does the liver do?



More than 500 vital functions have been identified with the liver. Some of the better-known functions include:

- Regulating blood clotting
- Production of bile, which helps break down fatty food
- Removal of toxins and drugs from the blood
- Manufacture of certain blood proteins
- Convert and stores excess glucose to use for energy
- Stores iron.

When the liver has broken down harmful substances, they are excreted in the bile into feces or filtered via the blood and kidneys and leave the body in the form of urine.

Assessment:
What is the purpose of the assessment?

- To ensure that you have no medical or surgical reasons to donate half of your liver.
- To ensure that you have no psychiatric conditions that

would exclude you from becoming a donor.
- To provide you and your family with all the necessary education and information prior to you deciding to go ahead with the surgery
- To ensure you are undertaking this decision of your own free will

What is involved in the assessment process?

The recipient must satisfy current criteria for liver transplantation and be active on the waiting list prior to the commencement of a living donor assessment. The evaluation ensures that the donor's liver is normal and of adequate size and that the donor does not have any medical or psychiatric illness that would increase the risk of the procedure. The transplant team have to be sure that the donation is voluntary and that there is no undue pressure on the donor to undergo living donation.

The evaluation will involve a series of blood and radiological investigations, reviews by separate medical and surgical consultants, psychiatric assessment and a review by the Independent Transplant Assessor. The Living Donor Transplant Coordinator will be responsible for coordinating the assessment and counselling the donor. You will also be requested to provide the legal documents including National ID Card, passport, photographs and birth certificates as proof to establish your relation with the recipient.

May I get my evaluation done by my own doctor?

No, Shifa International Hospital team will perform all the examinations for the living donor. We will coordinate appointments and try to minimize the number of visits to the hospital for assessment.

What is the first step in the evaluation process?

Testing the blood group is a simple blood test. You must be the same blood type as your recipient or blood group O. If you are a suitable blood type and are wishing to be considered as a living liver donor for your relative, you can contact the

transplant coordinator on telephone number and discuss living liver donation or schedule an appointment to meet in the hospital. Registration details can be taken over the phone and a hospital record created for you.

An appointment with the Transplant Coordinator and Transplant Surgeon will be arranged. The transplant coordinator will perform a health screen and provide an opportunity to ask questions. The transplant coordinator will inform you of the potential risks and benefits of living donation and what the evaluation process involves. The potential risks of donation and the possible outcomes of the donor evaluation will be discussed. The potential donor can stop the evaluation or withdraw from the process at any time right up to the donor surgery.

The surgeon will take a brief medical and surgical history and examine your abdomen. The surgeon will discuss living donor liver transplantation with you, including the potential risks and the statistics on the procedure at our hospital and worldwide. The surgeon will discuss the chances of donation being successful in each individual case.

The transplant coordinator will get you to sign a consent form if you are still intending to be assessed as a living liver donor. The followings tests will be done at this stage;

Blood tests:

- The function of your liver
- The ability of your blood to clot
- To see if you are anemic
- To assess the function of your kidneys
- To check the level of oxygen in your blood
- For viruses – including Hepatitis B, Hepatitis C, Cytomegalovirus
- (CMV) and the HIV virus.

The second step of evaluation.

CT scan liver dynamic: This CT scan will be performed before

and after injecting intravenous contrast. The CT scan will provide information, which includes:

- Approximate quantity of fat in your body.
- Volume of your right and left lobes of liver.
- Map of your blood vessels into and away from the liver.

After the CT scan you may be rejected for the liver donation due to:

- High fat quantity in your liver.
- Low volume of your liver.
- Inappropriate vessels of your liver.

After CT scan your heart, lungs, kidneys will be tested by various investigations. Your MRCP will also be performed to delineate the biliary anatomy. You may also be assessed to undergo liver biopsy in which a small piece of your liver will be taken with needle for examination under microscope.

Do I need to fast before my appointments?

You are not requested to fast prior to your CT or for your MRI. It is ideal that you have a fasting lipid profile, so that the Cholesterol level is accurate.

Should my family come with me to appointments?

It is helpful to have immediate family or next of kin with you to some of the appointments so they can participate in the evaluation process. It will provide them with a better understanding of the process. It also provides an opportunity for them to ask questions. The Independent Assessor is required to see both the donor and the recipient together if possible, as part of the assessment. The independent assessor will in time need to establish that there is no pressure or coercion on the donor from the family or others, and that donation is voluntary and that the donor has the capacity to understand what they are undertaking. The independent assessor will also need to establish the recipient's willingness to accept the living donation from the donor.

How quickly will I know if I can be a donor?

After the medical assessment is complete we can inform you of your suitability as a living donor. We cannot confirm until the final confirmation by the Human Tissue Authority return a permission number or reference to the particular application for permission to proceed to living liver donation. If you require time for contemplation or time to get your social supports in place, the transplant team will arrange the planned date for donation around your request. You may find you need time to digest all the information to consider the risks and benefits.

Who makes the final decision as to whether I can de a donor?

Once the tests are complete and the Human Tissue Authority is in agreement with the planned donation the transplant team will meet and review your results. The Hepatologist, Surgeon, Anaesthetist, Transplant coordinator, Social Worker and other specialists involved in your evaluation will have a multidisciplinary meeting.

If I am cleared to be a donor, who decides when to do the transplant?

This will be a joint decision between the transplant team, you and the recipient. The date will be arranged and the recipient's team will optimize the recipients' health for this date. However if there are cadaveric transplants on the day, then it is possible the living donation will be rescheduled. Resources have to be fully available for the living donor surgery to proceed to maintain optimal safety.

Once the transplant is scheduled, will it definitely happen?

No. It may not take place when it is planned due to the possible availability of cadaveric livers becoming available or due to the lack of availability of ICU beds, and the need to reschedule the living donation.

If the recipients' condition was to deteriorate the date may be brought forward. If they become un-transplantable it may change the plan. If the recipient had cancer there may be a request for an exploratory laparotomy prior to proceeding with the donation and if these were to show disease spread outside of the liver, the donation would not proceed. If a cadaveric donor became available the transplant team may proceed to use this organ and the living donor would not be used.

Can I change my mind?

Yes, you are completely free to withdraw from the procedure at any stage. Also the transplant team can stop the assessment process at any stage. You will be given a full explanation on this. The reason for withdrawal will be kept confidential and only the transplant team will be aware of it.

Who will I meet during the assessment?

Nurses.
Transplant Coordinator.
Consultant Hepatologist
Consultant Transplant Surgeon
Consultant Physician:
Consultant Anaesthetist
Consultant Psychiatrist:
Consultant Cardiologist:
Consultant Pulmonologist:
Consultant Nephrologist:
Consultant Dental Surgeon:
Physiotherapist

How much liver is removed?

The amount of liver required will depend on the size and the sickness of the recipient. For an adult-to-adult living donor transplant up to 60% of the donor liver may be removed. The liver is divided into a left and a right lobe. The anatomical division between the lobes enables the surgeon to divide the

liver into two distinct parts. Both parts of the liver can function independently of each other. The right lobe is approximately 60% of the liver and the left lobe approximately 40% of the liver. The donor gallbladder is removed. The recipient gallbladder is also removed at the time of transplant. For an adult to child living donation the left lateral segment of the liver is removed (about 20% of the liver).

What are the possible complications of the donor's operation?

As with any operation involving a general anaesthetic there are possible complications. While these complications are rare, the risk does exist and we will discuss them in more detail with you during the assessment. Generally 10- 20% of donors will experience some form of complication. This means there is a one in 5 chance that the donor will experience problems after the donation.

- Death – *the risk of death is very real and must be considered seriously.*

According to results reported from centers around the world the risk of death for the live liver donor is between 0.5% for adult to adult right lobe donation and 1 in 500 for left lateral segment donation for an adult to child donation.

- Need for urgent liver transplant – *If the remainder of your liver does not function properly you may require an urgent liver transplant to save your life. Every effort will be made during assessment that such an eventuality does not arise.*

The most common complications include;

- Bile leak – *from the cut surface of the liver, mostly settles with nonoperative treatment.*
- Bleeding – *the liver has a rich blood supply.*
- Clots in legs or lungs – *the same risk as with any other major abdominal surgery.*
- Heart attack – *you will be checked thoroughly prior to*

theatre for heart disease.
- Infection – *at the wound site or pneumonia.*

These usually resolve after a couple of weeks. There is a risk that pain management may be difficult and you could experience severe pain. You may experience nausea or itching or dizziness from the strong painkillers. While the risks are rare the however exist and will be discussed with you in detail by the transplant coordinator during your assessment. You will be likely to notice a loss of sensation on your lower abdominal wall but this will return over time.

Will I require a blood transfusion during my surgery?

It is unlikely that you will require a blood transfusion during the living donor surgery; however we prepare blood for transfusion in case it should be necessary.

Should I stop drinking alcohol?

Yes. If you are going to be a liver donor, stop drinking. If you have a history of heavy alcohol use you should tell your physician. Alcohol use may not preclude you from being a donor but you may need to undergo a liver biopsy to be sure your liver has not been damaged.

Should I stop smoking before my surgery?

Yes, we strongly advise you to stop smoking; even if you are a light smoker, as your risks of complications including chest infection and delayed wound healing will be significantly higher if you continue to smoke. Smoking may not preclude you from being a donor but you should stop it at least 4 weeks before surgery.

Should I stop taking my medication before the evaluation or the surgery?

No. Do not stop any prescription medication unless advised to

stop by a Doctor. Avoid Aspirin or non-steroidal medication such as Advil and Neurofen for seven days before a biopsy. These medications affect the ability of the blood to clot and put you at higher risk of bleeding complications. You may use Paracetamol. Women taking the contraceptive pill or pills for hormone replacement therapy will be advised to stop taking them because of the increased risk of blood clots during recovery from surgery.

How long will I be off work?

You could expect to be off work for 6 to 8 weeks. As people recover at different rates and varying degrees of fatigue and pain it may take up to 12 weeks to feel fully recovered. Ideally we prefer that you are in a position both financially and from a job security perspective to be able to take 12 weeks to recover if you need that much time.

How big is the incision?

The incision is large; it will go across your abdomen and is shape like "J".

Will I have much pain after surgery?

Yes. You will have significant pain after this surgery. You will be offered an epidural for pain relief. If there are difficulties with the epidural the pain team will organize an alternative pain control supply. It is important to control the pain as much as possible to enable you to breathe well and to begin to move comfortable as soon as possible after the surgery. You will need to be monitored closely as most pain medication is broken down by the liver and now you will have up to 60% less liver than before so you may be more sensitive to the drugs being administered. Most pain medication will make you drowsy and affect your breathing and bowel function. We try to get the balance right to ensure your safety and comfort. You need to be comfortable enough to be able to do your breathing exercises, coughing, limb exercises and walking. You will receive pain

medication on discharge to ensure your comfort at getting back to the daily activities of living you previously performed without any discomfort.

When can I engage in Sexual intercourse?

As soon as you feel comfortable. The decision will depend on how you are feeling.

If I want to start a family, how long should I wait after surgery to get pregnant?

It is advisable to wait at least 3 to 6 months to allow the abdominal wall optimal chance to recover and heal.

When can I restart oral contraceptive therapy or hormone replacement therapy?

It is advisable to wait for 3 months before restarting hormone therapy.

How long before my liver grows back to normal size?

The liver begins to re-grow almost immediately. The first two weeks after surgery probably sees the greatest surge in re-growth. By 3 months the liver is probably back to near its original size for both donor and recipient.

Would I be able to donate part of my liver again in the future to someone else?

No. You can only donate part of your liver once.

When will I be able to drive after my surgery?

We advise you not to drive for 6 weeks following your surgery. You must be physically and mentally strong, with normal reflexes and not experiencing any abdominal discomfort before you decide to drive. You should not be using medication with codeine in as these can affect your mental alertness.

When can I begin to exercise?

As soon as possible, you need to start taking long deep slow breaths once you wake up from the anaesthesia. You need to make a cough to ensure you are getting air into the bottom of your lungs. This will help to avoid chest infection. You should begin flexing and relaxing your limbs also. Move your feet in circular directions and bring your legs up and down the bed. Avoid friction to your heels, do not damage your skin. It is recommended that you try and do a few of these exercises hourly when awake. After 24 hours you will be assisted to sit to the edge of the bed with the physiotherapist and slowly transferred to a chair taking few steps initially and gradually increasing the amount of walking. You are encouraged to push yourself a little more each day.

Early mobilization helps to reduce the risk of blood clots and chest infection. You are encouraged to continue a program of daily exercise of walking and breathing and coughing. Remember the goal is to return to normal within 8 weeks.

When can I lift weights, jog, swim etc.?

You will need to avoid any heavy lifting for the 3 months until your abdomen has completely healed. You should not lift any weights greater than 10 kg. After 6 to 8 weeks you may begin to return to your normal activities if you are not having any complications. Swimming, jogging, cycling etc., should not be a problem, just begin slowly and build up gradually. Heavy lifting should not be attempted for 3 months.

How long will I be in the hospital?

The donor will be in hospital for approximately 7 to 10 days.

Will I be in the same room as the recipient after surgery?

Both the donor and the recipient will go to the Intensive Care following surgery. They will be in separate cubicles.

How soon will I be able to eat and drink after my surgery?

As soon as your intestines start to work again after surgery, you will be able to eat and drink. You will be able to wet your mouth and use oral swabs once you are awake. You will be started on sips of fluid the next morning and progress slowly to free fluids and light diet as you tolerate same.

Will I have any tubes or drains in me after the surgery?

Yes. You will have a naso-gastric tube in your nose draining your stomach. This will help to resolve any nausea as the bag drains the content of your stomach. You will have a central line in your neck into a large vein. This will be used to give you intravenous fluids to keep you hydrated and also to give you medicines. You will have a catheter in your bladder draining your urine to see how your kidneys are working during and after the surgery. You will have a small drain in the right side monitoring any potential ooze or leak form the cut edge of the liver. You will have a very fine catheter in your spine if you have an epidural for pain management. The tubes and drains will be removed over the next 4 to 5 days. The tube in the nose is usually removed on day 1 following surgery. The epidural is usually removed day 4 and so is the urinary catheter. The abdominal drain is usually removed about day 5 if it is clear and not draining very much. The neckline is removed about day 4 depending on the intravenous support being required. Once the intravenous fluids stop the donor is encouraged to drink up to 2 Litres of fluid and to resume diet as tolerated.

Will I need to come back to the hospital for checkups?

Yes, you will need to be monitored closely at first to ensure

everything is OK. You need to have bloods checked and an ultrasound to ensure there is no abdominal collection. You will be required to come to clinic at 1 week, 4 weeks and 6 months and then annually pending the findings.

Is it necessary that I remain close to the hospital after my surgery?

You will be discharged from the hospital between 7-10 days after your surgery, but it is necessary for you to remain in Islamabad/Rawalpindi for another two weeks so that you can visit us at any time if some complication occurs. If you are from overseas, we request you to stay in Pakistan for 4-6 weeks after donation.

Will I need to take any medications after I donate part of my liver?

Yes, you will be expected to require painkillers for a few days following discharge. If you should develop any complications you may require medications for it. We do not foresee that you would require any long-term medication following surgery.

Will I need a nurse to take care of me when I leave the hospital?

No. Extremely unlikely. You can expect to feel tired and weak; you will be more likely to need company and a helping hand. Your friends and family members will be more helpful with food shopping, cooking and generally helping out. Someone to accompany you to your follow up appointments would be helpful.

When will my stitches be removed?

You will have a dissolvable stitch in your wound which will not require removal. The only stitch to be removed will be the one securing the abdominal drain when that is to be removed

during your hospital stay.

Do I need to do any special preparation prior to the surgery?

The evaluation for donors is very thorough. Once the evaluation is complete and a decision to proceed is agreed there is little additional testing. You will have baseline bloods repeated the evening prior to the surgery and an ECG. You will be invited to see the intensive care and liver wards prior to your admission.

Do I need any special diet before the surgery?

No, eat and drink as normal. You need to fast for 6 hours prior to the planned operating theatre start time. If you take any regular medications you will be advised about these the night before surgery. You should not drink alcohol for 3 months preceding surgery. Remember if you use oral contraceptive therapy it must be discontinued 3 months before surgery. Do not take Aspirin or non-steroidal antiinflammatory drugs like Neurofen or Advil within seven days of your surgery.

Will I be admitted the night before surgery?

Yes, you and your recipient will be admitted to hospital approx 15.00hrs the day before your surgery. You will have been reviewed by the anaesthetist during the evaluation. The consultant surgeon will see you and complete a second consent form with you for the surgery. Remember you can change your mind up-to the time you are going to surgery.

What should I bring with me to the hospital?

Bring minimal belongings, no valuables, and no jewelry. Bring basic toiletry and ask your family to hold it for you. The time expected to lapse from the commencement of the donor evaluation to the setting of a potential date for surgery is approximately 2 weeks. In emergency situations the assessment can be complete in much less time.