PROTOCOL FOR
OUT-PATIENT MANAGEMENT
FOLLOWING
LIVER TRANSPLANTATION

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1. **AIM OF POST TRANSPLANT FOLLOW-UP**

The aim of liver transplant is to restore good health, well-being and independence to recipients. However, lifelong follow-up is necessary to maximise these aims and monitor the liver graft by:

1.1 Monitoring graft function:
   - Liver function tests, other investigations as indicated, eg. Doppler ultrasound, CT/MR, liver biopsy.
   - Observe for disease recurrence.

1.2 Monitoring immunosuppression:
   - Blood Ciclosporin, Tacrolimus or Sirolimus concentrations.

1.3 Detection/treatment of complications including rejection, infection, vascular and biliary complications, tumour and drug-induced complications, including hypertension, diabetes, renal impairment and hyperlipidaemia.

1.4 Health promotion advice and support for patients and relatives from a multi-disciplinary team.

2. **SCHEDULE**

The usual schedule of clinic visits, which will vary according to patients’ health and location, is as follows:

<table>
<thead>
<tr>
<th>TIME POST TRANSPLANT</th>
<th>FREQUENCY OF VISITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>discharge to 6 weeks</td>
<td>weekly - 2/52</td>
</tr>
<tr>
<td>6 weeks to 3 months</td>
<td>fortnightly</td>
</tr>
<tr>
<td>3 months to 6 months</td>
<td>monthly - 6/52</td>
</tr>
<tr>
<td>6 months to 1 year</td>
<td>bimonthly</td>
</tr>
<tr>
<td>after 1 year</td>
<td>3 to 6 monthly</td>
</tr>
</tbody>
</table>

These visits will alternate between referring hospital and the transplant unit once the patient’s condition is stable. The transplant unit clinic may be an outreach clinic located at the referring hospital.
3. **SHARED CARE**

After 6 months post-transplant, clinic visits may alternate between RIE and the recipient’s referring hospital, following agreement with the referring physician. The arrangements are as follows:

3.1 Secure agreement with referring physician in writing.

3.2 Outreach clinics, where patients are seen in their local hospital at a clinic run jointly by the referring physician and transplant unit staff ie consultant hepatologist and co-ordinator take place in Aberdeen, Dundee, North and South Glasgow, Inverness and Wishaw.

4. **RESULTS AND CORRESPONDENCE FROM REFERRING PHYSICIANS AND GPs**

4.1 The Transplant Co-ordinators are responsible for requesting and obtaining results on behalf of SLTU Medical Staff from Referring Physicians and GPs.

4.2 Results should be returned to SLTU either in writing or by fax to the Transplant Co-ordinators on 0131 242 1722.

4.3 All abnormal results will be reviewed by SLTU consultant staff at the weekly follow-up meeting.

5. **ROLE OF GENERAL PRACTITIONER**

5.1 The GP’s assistance in post transplant follow-up care is encouraged to facilitate ongoing monitoring between hospital clinic visits and will be requested on an individual basis.

5.2 The GP remains the patient’s first line of medical contact for all general non-transplant related health enquiries.

5.3 GPs can access the shared-care protocols on the Lothian Joint Formulary site at the following address [http://www.ljf.scot.nhs.uk/sharedcareprotocols/scp/pages/default.aspx](http://www.ljf.scot.nhs.uk/sharedcareprotocols/scp/pages/default.aspx)
6. ROUTINE CLINIC DUTIES

6.1 Weight

6.2 Blood pressure

6.3 Blood sampling

6.3.1 Routine for all visits

6.3.1.1 Clinical Chemistry:
- Na, K, C0₂, urea, creatinine, bilirubin, ALT, GGT, alkaline phosphatase, albumin
- blood levels ciclosporin, tacrolimus or sirolimus.

6.3.1.2 Haematology
- Full blood count

6.3.2 Specific to certain categories

6.3.2.1 Glucose - all clinic visits in first 3/12

6.3.2.2 Lipids - annually

6.3.2.3 Serum anti-HBs - sample to virology
- all clinic visits in patients transplanted for hepatitis B.

6.3.2.4 Alcohol - (yellow tube to clinical chemistry)
- at all clinic visits in patients transplanted for Alcoholic Liver Disease.

6.4 History:
enquire specifically about:
- symptoms on last visit
- new symptoms
- jaundice, stool/urine colour, fever, abdo pain
- dyspepsia, vomiting, diarrhoea
- cough, dyspnoea
- headaches, paraesthesia, tremor
- fluid retention, arthralgia, fatigue
- skin changes

6.5 Record drugs:

6.5.1 immunosuppression
- Ciclosporin (Neoral), tacrolimus (specify Prograf or Advagraf), sirolimus, azathioprine or mycophenolate, prednisolone.

6.5.2 other drugs

6.5.3 check patient’s medication record book “greenbook”
6.6 Arrangements:

6.6.1 Contact for alterations in therapy

6.6.2 Next appointment

6.7 Documentation

The clinic findings will be recorded on a standard outpatient form (Appendix I) there is a separate form for waiting list patients (Appendix 2).

7. CLINIC REVIEW

The out patients seen in the preceding week will be discussed at a weekly clinic review attended by consultant hepatologist, consultant surgeon, medical registrar and transplant co-ordinator(s). Changes in therapy and other action will then be communicated via the transplant co-ordinators on behalf of the SLTU medical staff by telephone and documented in the case notes. Alteration in therapy or other action will also be included in the clinic letter sent to the GP and referring physician.
8. IMMUNOSUPPRESSION

8.1 CALCINEURIN BLOCKER (TACROLIMUS/CICLOSPORIN)

8.1.1 Introduction

The primary immunosuppressive drug will be one of the calcineurin blockers tacrolimus or ciclosporin. There are now a number of generic tacrolimus and ciclosporin formulations available. It is important to prescribe Prograf, Advagraf and Neoral by name to ensure that the correct formulation is given to maintain appropriate calcineurin levels.


8.1.2 Dosing

The dosage of tacrolimus or ciclosporin must take account of not only the blood concentration, but also the time since transplant, the history of rejection and the side effects, particularly the presence of renal impairment. Toxicity within the recommended blood concentrations can occur.

The dose of immunosuppressive drugs should take account of the relative risks of rejection – the high risk patients are those with a previous history of rejection, younger patients, females and those transplanted for autoimmune diseases. (eg. autoimmune hepatitis and primary biliary cirrhosis). Severely malnourished patients and those with renal failure have a lower risk of rejection.

8.1.3 Recommended trough blood levels

8.1.3.1 Tacrolimus

<table>
<thead>
<tr>
<th>Time After Transplant</th>
<th>Trough Blood Level (µg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6 months</td>
<td>5 - 12 µg/l</td>
</tr>
<tr>
<td>after 6 months</td>
<td>4 - 10 µg/l</td>
</tr>
</tbody>
</table>

8.1.3.2 Ciclosporin

<table>
<thead>
<tr>
<th>Time After Transplant</th>
<th>Trough Blood Level (µg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 6 months</td>
<td>100 - 150 µg/l</td>
</tr>
<tr>
<td>6 months onwards</td>
<td>70 - 100 µg/l</td>
</tr>
</tbody>
</table>

8.1.4 Dosage Adjustment

If patient has tacrolimus/ciclosporin concentration too high or too low, consider the reason prior to adjusting the dose, eg:

- tacrolimus/ciclosporin too high:
Did the patient take ciclosporin/tacrolimus on the day of the assay?
Has the patient taken any new drugs?

- tacrolimus/ciclosporin too low:

  Is the patient compliant?
  Is there impaired absorption? Vomiting or diarrhoea?
  Has the patient taken any new drugs?

**If adjusting dose, increase or decrease by approximately 20%**

8.1.5 Tacrolimus/ciclosporin toxicity

Warning evidence of tacrolimus/ciclosporin toxicity:
headaches, paraesthesia, tremor, fits nausea, vomiting, diarrhoea
hypertension, hyperkalaemia, renal impairment, arthralgia, diabetes mellitus

8.1.6 Drug Interactions

Drug interactions with tacrolimus/ciclosporin

Assume any drug may interact with tacrolimus/ciclosporin until you know it does not.

If in doubt, contact SLTU pharmacist (Bleep 5132) and monitor U/Es, creatinine and blood tacrolimus/ciclosporin concentrations at least 2 x weekly.

The following drugs are known to interact:

8.1.6.1 **Increase** tacrolimus/ciclosporin concentration (anticipate toxicity and reduce dose or be guided by blood ciclosporin/tacrolimus concentrations measured < 1/52 after starting medication).

- amiodarone
- anti-retroviral therapy
- clarithromycin
- danazol
- diltiazem
- erythromycin
- fluconazole (> 200 mg/day)
- itraconazole
- ketoconazole
- nicardipine
- progestogens
- Telaprevir/boceprevir

8.1.6.2 **Reduce** tacrolimus/ciclosporin concentration (anticipate increase requirements but be guided by blood tacrolimus/ciclosporin concentrations measured > 1/52 after starting medication).

- carbamazepine
- griseofulvin
- phenobarbital
- phenytoin
- primidone
- rifampicin

8.1.6.3 Increase risk of hyperkalaemia
• potassium-sparing diuretics
• ACE inhibitors - captopril etc

8.1.6.4 increase risk of nephrotoxicity (monitor urea + creatinine 2 x week initially).

– acyclovir
– amphotericin
– co-trimoxazole
– ganciclovir
– gentamicin
– NSAIDs
– neomycin
– valganciclovir
– Any nephrotoxic drugs

8.1.7 Tacrolimus in Patients with Anaemia/Hypoalbuminaemia

Because the drug is highly red blood cell and protein bound, increased efficacy/toxicity for a given whole blood concentration will occur if there is anaemia or hypoalbuminaemia.

8.1.8 Tacrolimus/Ciclosporin in Patients with Hepatic Dysfunction

Tacrolimus concentration is increased if hepatic function is decreased. Ciclosporin (Neoral) concentration may be reduced in severe cholestasis or steatorrhoea.

8.1.9 Shared care protocols are available at http://www.ljf.scot.nhs.uk/sharedcareprotocols/scp/pages/default.aspx

8.2 PREDNISOLONE

Prednisolone is used initially as an immunosuppressant but will normally be discontinued after 3/12.

Reduce prednisolone dose as follows:

<table>
<thead>
<tr>
<th>TIME POST TRANSPLANT</th>
<th>DAILY DOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3 weeks</td>
<td>20mg</td>
</tr>
<tr>
<td>3 - 6 weeks</td>
<td>15mg</td>
</tr>
<tr>
<td>6 - 9 weeks</td>
<td>10mg</td>
</tr>
<tr>
<td>9 - 12 weeks</td>
<td>5mg</td>
</tr>
<tr>
<td>after 3 months</td>
<td>0*</td>
</tr>
</tbody>
</table>

*The two exceptions to discontinuation are:
- patients with autoimmune chronic active hepatitis who should remain on 5mg/day to reduce risk of disease recurrence.
- patients with hepatitis C infection who should remain on 5mg/day for 12 months.
8.2.1 Following Treatment of Acute Rejection

If the patient receives high dose steroid therapy for cellular (acute) rejection, restart prednisolone at 20 mg per day and reduce according to the above schedule, taking the episode of rejection as time zero.

8.3 AZATHIOPRINE

Continue at 1 mg per kg once daily, unless bone marrow suppression as follows:

<table>
<thead>
<tr>
<th>WBC</th>
<th>2 - 3 x10^9/l</th>
<th>&lt; 2 x10^9/l</th>
<th>0.5mg per kg per day</th>
<th>stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platelets</td>
<td>40 - 60 x10^9/l</td>
<td>&lt; 40 x10^9/l</td>
<td>0.5mg per kg per day</td>
<td>stop</td>
</tr>
</tbody>
</table>

8.4 MYCOPHENOLATE MOFETIL

Also known simply as Mycophenolate or MMF, this drug which is a similar but more potent immunosuppressant to azathioprine, may be used in 4 situations:

8.4.1 Patients who have received induction therapy with Basiliximab will have been commenced MMF instead of Azathioprine at the time of transplant.

8.4.2 Patients with early chronic rejection, in combination with tacrolimus.

8.4.3 Patients with renal impairment to allow either

8.4.3.1 Dose reduction of CNI in combination with MMF

8.4.3.2 Replacement of CNI with MMF and Prednisolone

The dosage is 1 - 2g/day. It is less prone to causing marrow suppression than azathioprine but has significant risk of GI intolerance, both nausea and diarrhoea, which can be reduced by introducing the drug in a step wise manner and dividing the daily dose.

8.4.4 The sequence of steps in patients with mild-moderate renal impairment more than 6 months after transplant and with normal graft function is as follows:

i) 24 hr urine for creatinine clearance
ii) MSU for Protein/Creatinine Ratio
iii) Renal ultrasound

If creatinine clearance in range 20 – 70ml/min and investigations do not suggest renal impairment for reasons other than CNI toxicity changing from CNI to MMF and prednisolone should be carried out.

iv) Commence MMF 500mg bd, increasing to 1g bd if no side effects.

v) Once established on full dose MMF, commence prednisolone 10mg/day and half dose of CNI.

vi) Continue to half dose of CNI at monthly intervals until discontinued all together, providing LFTs remain normal.

vii) Reduce Prednisolone to 7.5mg. Further reduction should be discussed with consultant hepatologist.
8.5 **SIROLIMUS**

Also known as Rapamune, used as renal-sparing immunosuppressant in a similar way to mycophenolate or in patients with HCV recurrence who cannot tolerate treatment.

Side effects of Sirolimus include delayed wound healing, dyslipidaemia, marrow suppression, haemolysis and proteinuria.

If changing from CNI to Sirolimus

Prior to commencing Sirolimus:

(i) Dipstick urine sample for protein, if positive do not start Sirolimus until Protein/Creatinine Ratio (PCR) result is back

(ii) If positive send specimen for (PCR)
- If PCR >50mg/mmol (protein>0.5g) the consultant will decide if the benefit of starting Sirolimus outweighs the risk of increasing proteinuria.
- If PCR>100mg/mmol (protein >1g) Sirolimus is not recommended and should only be started after careful consideration by a consultant.

(iii) Commence Sirolimus at 2mg once a day.
- If there are concerns about the patients white count consider starting on 1mg Sirolimus and leaving half-dose CNI until trough level available.

(iv) Half-dose of CNI for three days then stop. (Ciclosporin doses should be halved but needs to be taken at least 4 hours before or after Sirolimus)

(v) Azathioprine or MMF should not be discontinued until 1 month post change over.

(vi) FBC, LFTs and Sirolimus level should be checked after 7-10 days

(vii) Trough levels should be taken as with CNIs

(viii) Levels 4-6ng/ml (be guided by the LFTs)

(ix) If proteinuria when commencing Sirolimus, Urinary PCR at each clinic visit to keep an eye on what is happening

(x) If no proteinuria annual PCR at a minimum

As Sirolimus is not yet licensed in liver transplantation GPs may not be willing to prescribe - in this case contact Janice Davidson, Senior Research Nurse, to organise supplies.
8.6 OTHER DRUGS

At 3 months post-transplant, the following drugs can be discontinued:

- co-trimoxazole
- fluconazole
- ranitidine
- valganciclovir

8.6.1 If patient receives IV Methylprednisolone, and then 20mg daily of oral prednisolone, for confirmed rejection then co-trimoxazole, fluconazole and ranitidine (and valganciclovir, if CMV mismatch) should be continued (or recommenced) until prednisolone is reduced to 5mg daily.
9. MANAGEMENT OF SPECIFIC PROBLEMS

9.1 ABNORMAL LIVER FUNCTION TESTS  see inpatient protocol and appendices.

If symptomatic or severe, admit to SLTU. If asymptomatic and mild, may monitor and perform non-invasive investigations (eg. blood tests and ultrasound/Doppler) as outpatient. The history and pattern of abnormality may guide investigation, but in general, consider the following, whilst remembering that imaging is fallible (eg. normal Doppler does not exclude hepatic vein obstruction, and normal USS does not exclude biliary obstruction).

9.1.1 Biliary problem? (predominant increase in alk phos)

Ultrasound: - if biliary dilatation → MRCP.
Roux anastomosis → MRCP.
Duct-to-duct anastomosis → MRCP or ERCP (remember antibiotic cover)

9.1.2 Hepatic problem? (predominant increase in transaminases)

9.1.2.1 Vascular problem?
Doppler: if abnormal or inconclusive → angiogram – CT angio in first instance.

9.1.2.2 Rejection? - Liver biopsy

9.1.2.3 Viral hepatitis?

Blood - Virology (CMV, EBV, HBV, HCV).
Liver biopsy:

9.1.2.4 Recurrence of original disease?

Serology, biopsy, and/or cholangiography as appropriate.

9.2 FEVER

If the patient, or his/her GP, contacts SLTU because of a fever, consider admission to SLTU or referring hospital. Consider bacterial, viral, fungal or other infection, and remember rejection and ischaemia can cause fever. (See in-patient protocol.) Common causes of fever after discharge from hospital are CMV infection and cholangitis due to biliary stricture(s).

Remember clarithromycin causes increased tacrolimus/ciclosporin concentration.

9.3 CMV

If patient is suspected of having CMV disease send 10ml red (EDTA) tube to virology for CMV-DNA by PCR rapid culture. If appropriate can also send tissue (gastric, colonic, liver biopsy material) for CMV culture – discuss cultures beforehand with virology (Duty Virologist, REI bleep 5981). Quantitative PCR for blood CMV-DNA is also available.
Valganciclovir dosing for prevention of CMV

<table>
<thead>
<tr>
<th>CrCL (ml/min) (Cockcroft Gault)</th>
<th>Valganciclovir tablets</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 60</td>
<td>900mg once daily</td>
</tr>
<tr>
<td>40-59</td>
<td>450mg once daily</td>
</tr>
<tr>
<td>25-39</td>
<td>450mg every 2 days</td>
</tr>
<tr>
<td>10-24</td>
<td>450mg twice weekly</td>
</tr>
<tr>
<td>&lt; 10</td>
<td>Use oral solution</td>
</tr>
</tbody>
</table>

Valganciclovir (oral) dosing for treatment of CMV

<table>
<thead>
<tr>
<th>CrCL (ml/min) (Cockcroft Gault)</th>
<th>Valganciclovir tablets</th>
</tr>
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<tr>
<td>≥ 60</td>
<td>900mg twice daily</td>
</tr>
<tr>
<td>40-59</td>
<td>450mg twice daily</td>
</tr>
<tr>
<td>25-39</td>
<td>450mg once daily</td>
</tr>
<tr>
<td>10-24</td>
<td>450mg every 2 days</td>
</tr>
<tr>
<td>&lt; 10</td>
<td>not recommended-discuss with pharmacist</td>
</tr>
</tbody>
</table>

Alternatively IV ganciclovir may be used in certain cases e.g. (severe disease, unresponsive disease. Usually for a 2 week initial course)

<table>
<thead>
<tr>
<th>CrCL (ml/min) (Cockcroft Gault)</th>
<th>Ganciclovir (IV) dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;70</td>
<td>5mg/kg 12 hourly</td>
</tr>
<tr>
<td>50-69</td>
<td>2.5mg/kg 12 hourly</td>
</tr>
<tr>
<td>25-49</td>
<td>2.5mg/kg 24 hourly</td>
</tr>
<tr>
<td>10-24</td>
<td>1.25mg/kg 24 hourly</td>
</tr>
<tr>
<td>&lt;10</td>
<td>1.25mg/kg 24 hourly (given after HD on dialysis days)</td>
</tr>
</tbody>
</table>

If patient is well and lives sufficiently close to the transplant unit or their referring hospital to visit twice daily, it may be possible to administer this IV course as an outpatient.

9.4 HYPERTENSION

Definition of Hypertension
Systolic BP ≥140mmHg and/or
Diastolic BP ≥90mmHg

Targets for treatment are:
Diabetes or renal disease absent  BP<140/90 mmHg
Diabetes or renal disease present  BP<130/80 mmHg

Treat as follows:-
Step one  lifestyle modification
  Consider reducing ciclosporin/tacrolimus
Step two  **Proteinuria:** Amlodipine (5-10md od)
Step three  Ramipril (1.25-5mg od) or Losartan (50mg-100mg od)
Step four  Addition of doxasosin 1mg daily (maximum of 16mg daily)
  -monitor for hyperkalaemia
9.5 **HEADACHES**

9.5.1 Exclusion of serious pathology (eg. intracranial space occupying lesion or infection).

9.5.2 Consider tacrolimus/ciclosporin toxicity.

9.5.3 Simple analgesia

9.5.4 Anti-migraine regime

**Treatment:** paracetamol and metoclopramide

**Sumatriptan**

**Prophylaxis:** pizotifen

propranolol

amitriptyline

9.6 **OBESITY**

Common problem post-transplant. Document BMI. Management includes:

9.6.1 Stop prednisolone (if possible).

9.6.2 Keep tacrolimus/ciclosporin at lower end recommended range.

9.6.3 Refer to SLTU dietician (Bleep 2907).

9.6.4 Screen for diabetes mellitus/hyperlipidaemia.

9.7 **HYPERLIPIDAEMIA**

Monitor annually.

If cholesterol > 5.0mmol/l or established CVD, or hypertension + CVD risk > 20% at 10 yr (see British Hypertensive Society) introduce a statin.

- Drug of choice is simvastatin or atorvastatin

Monitor LFTs fortnightly for first three months of therapy and check CK if patient complains of myalgia. (if cholestatic → cholestyramine)

9.8 **DIABETES MELLITUS**

Criteria for diagnosis of new onset diabetes mellitus after liver transplantation:

**Symptomatic of hyperglycaemia (eg. Polyuria)**

Random plasma glucose ≥ 11.1mmol/l

**Asymptomatic**

Random plasma glucose ≥ 11.1mmol/l

on two separate occasions.

Or

Fasting plasma glucose ≥ 7.0 mmol/l

Or

Two hour oral glucose tolerance test ≥ 11.1mmol/l
**Stepwise treatment Diabetes after Transplant**

Step one  Therapeutic lifestyle change; patient education  
Step two  Monotherapy with oral antibiotic medication  
Step three  Oral combination therapies to maximum effective dose of agents in each class  
Step four  Insulin +/- oral agent  
Step five  Insulin monotherapy adjusted to achieve target glucose levels  

9.9  **OSTEOPOROSIS**

9.9.1  Suspected osteoporosis should be confirmed by DEXA scanning (either at referring hospital or via Dr Hannan at WGH).

9.9.2  Treatment should be provided with bisphosphonates- Alendronate 70mg weekly or Risedronate 35mg weekly.

9.9.3  Patients on long-term steroids should have DEXA scans every 3 years.

9.10  **CARDIOVASCULAR DISEASE RISK**

Patients on long term immunosuppression following liver transplant are at increased risk of cardiovascular disease (coronary artery disease and stroke) due to hypertension, hyperlipidaemia, obesity, diabetes and renal dysfunction. Their risk should be calculated annually using BHS charts (see appendix 3 or http://cvrisk.mvm.ed.ac.uk/calculator/calc.asp).

Aspirin 75mg/day for patients with pre-existing CVS complications or for primary prevention if any of above risk factors and a calculated CVD risk > 20% at 10 yrs.
10. **MALIGNANCY SCREENING**

10.1 **HEPATIC TUMOURS**

Following review of hepatocellular cancer (HCC) follow-up in SLTU patients it has been agreed that patients transplanted for HCC, or who were found to have previously undetected tumour, do not require routine CT scans or AFP. AFP and a CT scans should be requested if clinical suspicion of re-occurrence.

**CERVICAL CANCER**

Annual cervical smears should continue for women up to age of 60.

10.2 **DERMATOLOGY**

- All patients post transplant should receive a copy of the British Association for Dermatology patient leaflet: Information about Skin Cancer for Patients with an Organ Transplant (Appendix 4)
- Patients should be made aware of the increased risk of developing skin cancer after transplant
- Advice on skin care should be reinforced as part of the transplant annual review
- A rapid referral to specialist dermatological care must be made in any case of suspected malignancy
- If the patient is from outwith NHS Lothian responsibility for this referral will be clearly transferred by urgent letter to the responsible clinician in the patient’s own health board.

10.3 **COLON CANCER**

Patients with ulcerative colitis transplanted for primary sclerosing cholangitis are at particularly high risk of colon cancer. They require annual screening colonoscopy.

11. **HEPATITIS B**

11.1 In-patients transplanted for hepatitis B monitor anti-HBs titre (10 ml blood in plain (white) monovette tube to virology) on each clinic visit.

11.2 If anti-HBs titre is less than 100 units (result usually notified by telephone), give 10,000 units of hepatitis B immunoglobulin (HBlg) (obtained from Pharmacy) as an intravenous infusion over 5 hours. Initial rate of infusion at 0.1ml/kg/hour for 10 minutes, if tolerated this can be doubled every 10 minutes to maximum of 1ml/kg/hour.

11.3 Note that the frequency of administration of HBlg varies widely.

11.4 HBlg should be stopped after 12 months.

Patients currently on HBlg & Lamivudine will be converted to Tenofovir.

The standard dose of Tenofovir is 245mg OD, however if significant renal impairment dose reduction may be required.

11.5 Check HBV-DNA if considering recurrent disease.
12. **HEPATITIS C**

HCV recurrence is universal; the effect on the graft is variable.

Liver biopsies should be performed annually to determine the extent of liver damage. Antiviral treatment will be instituted after discussion with a transplant hepatologist in cases with histological evidence of progressive disease with fibrosis.

Usual treatment is with Pegylated Interferon and Ribavirin in standard doses organised via the HCV clinic, RIE. In some instances triple therapy with protease inhibitors may be used.

Contact Kim MacBeth, Clinical Nurse Practitioner on bleep #6225 for Lothian patients, or via referring physician for non-Lothian patients.

13. **ALCOHOLIC LIVER DISEASE**

13.1 Patients transplanted for alcoholic liver disease will have signed a contract prior to transplant agreeing to:-

1) continued abstention from alcohol

2) testing for alcohol in blood

3) alcohol counselling if required

13.2 Post operatively, these patients will be seen at their 6 month and 12 month clinic visit by one of the alcohol liaison nurses from the Department of Psychological Medicine.

13.3 Blood should be taken for ethanol on a regular basis.

14. **INFLUENZA**

Patients should receive annual influenza vaccine.

15. **WAITING LIST PATIENTS**

Patients on the waiting list for OLT will be seen at regular intervals (usually 4-6 weekly)
# SLTU Clinic Summary

<table>
<thead>
<tr>
<th>Name</th>
<th>Date seen</th>
<th>Date of Transplant</th>
<th>Type of Graft</th>
<th>Age</th>
<th>Seen by: Cons / SpR / Coord</th>
</tr>
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## Clinic Update

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<th>Follow-up</th>
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**APPENDIX 2**

Liver Transplant Waiting List Out Patient Summary

*Addressograph label*

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<th>Seen by:</th>
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<tr>
<td>Date Seen:</td>
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Has discussion re DCD taken place: Y/N

Has discussion re Split liver taken place: Y/N

LDLTx Discussed Y/N Reason for not proceeding

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<th><strong>Diagnosis:</strong></th>
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<tr>
<td>Drug</td>
<td>Dose</td>
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Smoker: BP / Diabetic: IDDM / NIDDM Weight:

Alcohol: HBA1c: Girth:

Oesophageal Varices Y/N Banding or Beta Blockers

DEXA scan required: Y/N Colonoscopy Required (PSC): Y/N

AFP: every 6 months or every 2 months if HCC

Imaging required: USS & Doppler or 4 monthly CT if HCC: Date of last imaging:

RFA / TACE Date:

<table>
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<th><strong>Bloods:</strong></th>
<th><strong>Group &amp; Save (if transfused since last sample):</strong></th>
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<tbody>
<tr>
<td>Bili</td>
<td>Creat</td>
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<td>Ethanol</td>
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Admissions to Hospital since Last Clinic / Comments

ENCEPHALOPATHY / PERIPHERAL OEDEMA / ASCITES

Referral from this appointment: Dietician: Y/N Social Worker: Y/N ALN: Y/N Other:
APPENDIX 3  Cardiovascular Risk Charts

NON-DIABETIC MEN

Age under 50 years

Non-smoker

Smoker

180
160
140
120
100

SBP

TC : HDL

3 4 5 6 7 8 9 10

CVD risk < 10% over next 10 years
CVD risk 10–20% over next 10 years
CVD risk > 20% over next 10 years

Age 50 – 59 years

SBP

TC : HDL

3 4 5 6 7 8 9 10

CVD risk over next 10 years

10% 20% 30%

SBP = systolic blood pressure mmHg
TC : HDL = serum total cholesterol to HDL cholesterol ratio

Age 60 years and over

SBP

TC : HDL

3 4 5 6 7 8 9 10

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NON-DIABETIC WOMEN

Age under 50 years

Non-smoker

Smoker

Age 50 – 59 years

Age 60 years and over

SBP = systolic blood pressure mmHg
TC : HDL = serum total cholesterol to HDL cholesterol ratio

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Appendix 3: British Association of Dermatologists Information

INFORMATION ABOUT SKIN CANCER FOR PATIENTS WITH AN ORGAN TRANSPLANT

What are the aims of this leaflet?

This leaflet has been written to help you understand the risk of developing skin cancer after receiving an organ transplant. It explains the importance of early detection and treatment of skin cancers. It describes the main types of precancerous and cancerous skin growths, how you can reduce the risk of getting skin cancer, and how skin cancer can be treated.

If you are going to have, or have had an organ transplant, it is important that you take good care of your skin. This is because people having transplants are more at risk of developing skin cancer than other people.

This leaflet gives you some advice on looking after your skin and provides information on:

- The importance of early detection and treatment of skin cancers
- The way to decrease the risk of skin cancers

Why am I more at risk from skin cancer?

If you have had a transplant you will be given immunosuppressive drugs to prevent you rejecting the transplanted organ. These work by dampening down your immune (defence) system. However, these treatments also increase the risk of skin cancer and some benign tumours and infections.

How likely am I to get skin cancer?

All transplant patients are at risk of developing skin cancer and the risk increases with time. For instance, twenty years after transplantation, more than half of all transplant patients will have had a skin cancer. Whilst all transplant patients are at risk, some are more likely than others to develop skin cancer. Patients with any of the following are at a higher risk than others:

- Fair skin that burns easily
- Light coloured eyes, e.g. blue, grey or hazel
- Naturally blonde or red hair
- Numerous freckles
- Outdoor work or heavy sun exposure in the past
- History of skin cancer

The darker your skin colouring, the less likely you are to develop skin cancer.
How can I spot signs of skin cancer?

Treatment will be much easier if your skin cancer is detected early. Check all of your skin for changes once a month. You may need to use a mirror. A friend or family member can help you with this.

You should see your doctor if you have any marks on your skin which are:

- Growing
- Bleeding
- Changing in appearance in any way
- Never healing completely

Below, we describe what skin cancers and related lesions look like.

- **Actinic keratoses (also known as solar keratoses).** Skin cancers may be preceded by a pre-cancerous condition known as actinic keratoses. These are usually pink or red spots, with a rough surface, which appear on skin that is exposed to the sun. The head, face, backs of the hands and forearms are most often affected. Actinic keratoses may be easier to feel (as they are rough) than they are to see. Although most actinic keratoses will never become cancerous, treatment is advisable to minimise the possibility (see Patient Information Leaflet on Actinic Keratoses).

- **Basal cell carcinoma (and rodent ulcer).** Most basal cell carcinomas are painless. People often first become aware of them as a scab that bleeds occasionally and does not heal completely. Some basal cell carcinomas are very superficial and look like a scaly flat red mark: others show a white pearly rim surrounding a central crater. If left for years, the latter type can erode the skin, eventually causing an ulcer - hence the name “rodent ulcer”. Other basal cell carcinomas are quite lumpy, with one or more shiny nodules crossed by small but easily seen blood vessels (see Patient Information Leaflet on Basal Cell Carcinoma).

- **Squamous cell carcinoma.** A squamous cell carcinoma usually appears as a scaly or crusty area of skin, with a red, inflamed base. It may look like an irritated wart, or break down to form a bleeding ulcer. Most small squamous cell carcinomas are not painful, but pain in a growing lump is a suspicious sign for squamous cell carcinoma. They occur most often on the head, neck, ears, lips, back of the hands and forearms. This is the most frequent type of skin cancer in organ transplant patients (see Patient Information Leaflet of Squamous Cell Carcinoma).

- **Melanoma.** Melanomas are much rarer, but are the most serious type of skin cancer. They are usually an irregular brown or black spot, which may start in a pre-existing mole or appear on previously normal skin. Any change in a mole, or any new mole occurring for the first time after the age of thirty, should be shown to your doctor.

Remember, if you see any change in your skin - whether an ulcer or a spot - you must tell your doctor or nurse. Any skin problem that does not heal should be shown to a skin specialist (dermatologist).

How is skin cancer diagnosed?

If your doctor thinks that the mark on your skin needs further investigation, a small piece of the abnormal skin (a biopsy), or the whole area (an excision), will be removed and examined under the microscope. You will be given a local anaesthetic beforehand to numb the area.
How can I reduce the risk of getting skin cancer?

There are many ways in which you can help to reduce your chance of getting skin cancer, these are:

- Learn how to recognise their early signs
- Examine your skin regularly for these signs
- Get an annual check from your doctor or nurse
- Protect yourself from the sun
- Do not use sunlamps and sunbeds

Exposure to the sun is the main cause of skin cancer in organ transplant patients. This does not just mean sunbathing; you expose yourself to the sun each time you do any outdoor activities, including gardening, walking, sports, or even a long drive in the car. The sun is a problem all year round, not just in summer.
You can take some simple precautions to protect your skin by following the below ‘top sun safety tips’:

- Protect your skin with clothing, and don’t forget to wear a hat that protects your face, neck and ears, and a pair of UV protective sunglasses.
- Spend time in the shade between 11am and 3pm when it’s sunny. Step out of the sun before your skin has a chance to redden or burn. Keep babies and young children out of direct sunlight.
- When choosing a sunscreen look for a high protection SPF (SPF 30 or more) to protect against UVB, and the UVA circle logo and/or 4 or 5 UVA stars to protect against UVA. Apply plenty of sunscreen 15 to 30 minutes before going out in the sun, and reapply every two hours and straight after swimming and towel-drying.
- Keep babies and young children out of direct sunlight.
- The British Association of Dermatologists recommends that you tell your doctor about any changes to a mole or patch of skin. If your GP is concerned about your skin, make sure you see a Consultant Dermatologist – an expert in diagnosing skin cancer. Your doctor can refer you for free through the NHS.
- Sunscreens should not be used as an alternative to clothing and shade, rather they offer additional protection. No sunscreen will provide 100% protection.
- Remember that winter sun, such as on a skiing holiday, can contain just as much of the damaging ultra-violet light as summer sun.
- Do not use sunbeds or sunlamps.
- Consider purchasing UV protective swim and beach wear which can particularly assist in protecting the trunk when swimming on holiday.
- It may be worth taking Vitamin D supplement tablets (available from health food stores) as strictly avoiding sunlight can reduce Vitamin D levels.

### Vitamin D advice

The evidence relating to the health effects of serum Vitamin D levels, sunlight exposure and Vitamin D intake remains inconclusive. Avoiding all sunlight exposure if you suffer from light sensitivity, or to reduce the risk of melanoma and other skin cancers, may be associated with Vitamin D deficiency.

Individuals avoiding all sun exposure should consider having their serum Vitamin D measured. If levels are reduced or deficient they may wish to consider taking supplementary vitamin D3, 10-25 micrograms per day, and increasing their intake of foods high in Vitamin D such as oily fish, eggs, meat, fortified margarines and cereals. Vitamin D3 supplements are widely available from health food shops.

### Can skin cancer be cured?

Most skin cancers, if treated early, can be cured. That is why it is important to report any new or changing skin lesion to your doctor.

Basal cell carcinomas can be cured in almost every case and seldom, if ever, spread to other parts of the body. Treatment may be more complicated if they have been neglected for a very long time, or if they are in an awkward place - such as near the eye, nose or ear.

In a few cases, squamous cell carcinoma and melanoma may spread (metastasise) to lymph glands and other organs.
How can skin cancer be treated?

- **Surgery.** Most skin cancers are excised (cut out) under a local anaesthetic. After an injection to numb the skin the tumour is cut away along with some clear skin around it. Sometimes a small skin graft is needed.

- **Curettage and cautery.** This is another type of surgery, done under local anaesthetic, in which the skin cancer is scraped away (curettage) and then the skin surface is sealed (cautery).

- **Cryotherapy.** Freezing the skin cancer with a very cold substance (liquid nitrogen).

- **Creams.** These can be applied to the skin. The two used most commonly are 5-fluorouracil (Efudix) and imiquimod (Aldara).

- **Photodynamic therapy.** This involves applying a cream to the skin cancer under a dressing for 4 to 6 hours. A special light is then shone on to the area and this destroys the skin cancer (see Patient Information Leaflet on Photodynamic Therapy).

- **The removal of lymph nodes.** This is usually undertaken only if the cancer has spread there, causing them to enlarge.

- **Radiotherapy.** X-rays are shone onto the area containing the skin cancer. It may also be used to relieve symptoms when a skin cancer has spread to other parts of the body.

- In some patients with more serious types of skin cancer, it may be advised that their immunosuppressant medication is reduced or stopped. In some circumstances, retinoid pills may be prescribed.

**Remember**

Most skin cancers can be avoided if you follow these basic rules:

- Check your skin for changes regularly
- Report any skin changes to your doctor or nurse promptly
- Always protect yourself from the sun
- Do not use sunlamps or sunbeds

Where can I get more information about skin cancer?


**Links to patient support groups:**

*Macmillan Cancer Support*  
89 Albert Embankment,  
London, SE1 7UQ  
Free helpline (for emotional support): 0808 808 2020  
Free helpline (for information): 0808 800 1234  
Web: www.macmillan.org.uk
This leaflet is based on recommendations adapted from those of the French Society of Dermatology, the British Association of Dermatologists and Cancer Research UK’s Sunsmart Campaign.