



**Protocol For  
Assessment For  
Liver Transplantation  
In Patients with Chronic Liver Disease**

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## **INTRODUCTION**

The assessment of patients for liver transplantation will take place in the Scottish Liver Transplant Unit (SLTU) and will cover two phases:

### **Phase I**

1. Establish the diagnosis and stage.
2. Ensure there are no alternative relevant medical or surgical therapies.
3. Exclude contraindications to transplantation.
4. Complete the assessment workup

### **Phase II**

1. Ensure that the patient and his/her relatives are prepared for making an informed decision about liver transplantation.
2. Prepare the patient for the waiting list.
3. If patient rejected ensure aware of potential for seeking a second opinion.

## **ADMISSION FOR ASSESSMENT**

Referral for liver transplant assessment is considered for patients who have end-stage liver disease, liver tumour, or who have an intolerable quality of life as a result of liver disease.

The decision to accept or refuse a referral must be made by a consultant. The case notes, with a referral letter, are the preferred mode of referral (*Appendix 1*). Patients with alcoholic hepatitis are generally not admitted for assessment. The transplant co-ordinator will arrange the patient's admission to the Transplant Unit from home. This will usually be within 6 weeks and any delay should be communicated to the referring consultant.

*The nurse-in-charge in Ward 206T will arrange transfer of inter-hospital transfer of patients.* In order that the assessment process is completed for the weekly assessment meeting, where possible, admission will be arranged for the beginning of the week.

### **Booking Investigations**

Endoscopies, CT and MRI scans are booked by the liver transplant coordinators.

Cardiovascular risk may have been partially assessed pre-admission

Other investigations will be booked by the junior medical staff.

## ASSESSMENT OF SUITABILITY FOR TRANSPLANTATION

### 1. Confirmation of Diagnosis

Patients coming to the SLTU for assessment are referred from a variety of hospitals and may not have had investigations performed as required for transplant assessment (*Appendix 2*). Their original hospital records must be obtained and reviewed so that unnecessary duplication of investigation is avoided. Imaging will be available on the national PACS archive.

#### Hepatic Parenchymal Disease

##### 1. Contact referring hospital.

NB previous biopsy to be sent to Dr Bellamy, Pathology RIE

##### 2. Notify pathologist re pending admission

The diagnosis of the underlying liver condition must be established as firmly as possible from review of previous medical records, supplemented by any necessary additional investigations. Histological confirmation should be obtained if there is doubt regarding the diagnosis, unless contraindications to liver biopsy are present, **and a review of previous liver biopsy should be requested from Dr Bellamy.**

## 2. Disease Severity

The severity of the liver disease is the single most important criterion for liver transplantation. The current severity of liver disease should be documented using the Pugh, MELD and UKELD score. Minimal listing criteria now exist and for non-HCC patients a UKELD of 49 or above is required for listing unless one of the following variant syndromes is present.

### **Variant syndromes and definitions for selection to the adult elective liver transplant waiting list**

- |                                     |  |
|-------------------------------------|--|
| i. Diuretic resistant ascites       | Ascites unresponsive to or intolerant of maximum diuretic dosage and non responsive to TIPSS or where TIPSS deemed impossible or contraindicated and in whom the UKELD score at registration is less than or equal to 49.  |
| ii. Hepatopulmonary syndrome        | Arterial pO <sub>2</sub> less than 7.8 kPa. Alveolar–arterial oxygen gradient greater than 20 mm Hg. Calculated shunt fraction greater than 8% (brain uptake following technetium macro-aggregate albumin), pulmonary vascular dilatation documented by positive contrast enhanced trans-thoracic echo in the absence of overt chronic lung disease. |
| iii. Chronic hepatic encephalopathy | Confirmed by EEG or trail making tests with at least two admissions in 1 year due to exacerbations of encephalopathy that has not been manageable by standard therapy. Structural or neurological disease must be excluded by appropriate imaging and if necessary psychometric testing.   |
| iv. Persistent and intractable      | Pruritus consequent on cholestatic liver disease which is pruritus intractable after therapeutic trials which might include cholestyramine, ursodeoxycholic acid, rifampicin, ondansetron, naltrexone and after exclusion of psychiatric co-morbidity that might contribute to the itch.   |
| v. Familial amyloidosis             | Confirmed transthyretin mutation in the absence of significant debilitating cardiac involvement or autonomic neuropathy.   |
| vi. Primary hyperlipidaemias        | Homozygous familial hypercholesterolaemia with absent LDL receptor expression and LDL receptor gene mutation.  |
| vii. Polycystic liver disease       | Intractable symptoms due to the mass of liver or pain unresponsive to cystectomy or severe complications secondary to portal hypertension.   |

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*Gut* 2008;57:252–257.

### 3. General Health and Specific Problems

An overall assessment of general health and fitness for transplantation is important particularly in older subjects. The following investigations should be undertaken (*Appendix 2*):

**Haematology:** Full blood count.

**Liver function:** Liver function tests, ie. albumin, total protein, bilirubin, alk phos, GGT, AST, ALT, ferritin, alpha-1-antitrypsin, alpha fetoprotein and caeruloplasmin, a full coagulation screen initially followed by prothrombin time only thereafter.

**Renal function:** Urinalysis (dip stix), urea, creatinine, sodium, potassium and total CO<sub>2</sub> concentrations. **The creatinine clearance should be measured in all patients.**  
Refer patients with eGFR < 30ml to renal physician on for transplant during assessment week.

**Metabolic:** Fasting plasma glucose. Diabetes mellitus is diagnosed when the fasting glucose is > 7.8 mmol/l, random glucose > 11.2 mmol/l or the glucose 2h after 75 g glucose orally is > 11.1 mmol/l.  
Fasting full lipid screen.

Bone density should be considered in all patients with chronic liver disease. Fracture risk should be assessed with either the Frax or QFracture score to determine who would be most suitable for bone densitometry i.e those with a risk of >10% at 10 years.

**Respiratory:** Chest x-ray.  
Pulmonary Function Tests.

**Heart:** ECG. Echo if not already performed at referring hospital  
CPEX (arranged by anaesthetist)  
See appendix 6 for additional information

**Microbiological investigations:** culture of urine, ascites, sputum (if available) and any other relevant site (eg. lines). Screening for MRSA should be undertaken on samples including nasal swabs.  
Screen for CPE (*Carbapenemase Producing Enterobacteriaceae*) if patient meets at risk criteria.  
See local guidance on intranet.  
<http://intranet.lothian.scot.nhs.uk/Directory/InfectionPreventionAndControl/Policies/CPE%20Screening.pdf>

**Serology:** One brown serology should be sent for HBV (HDV if HBV+), HCV and HIV, CMV, EBV and VZV.  
The patient's blood group, if not already available, should be checked with 2 separate samples.

#### 4. Radiology and Endoscopy

There is a rota for the radiologist covering transplant for the week. The duty radiologist is responsible for dealing with any imaging queries relating to the assessment patients for that week. Scans should be prioritised on Mondays and Wednesdays to allow for reports to be available for the assessment meeting. The duty radiologist will report any radiological investigations required for patient assessment.

If required the duty radiologist will attend the assessment meeting to discuss the scan results.

##### Hepatic Circulation

The hepatic artery and the portal and hepatic veins will be examined by CT scan.

Portal hypertension will be assessed from evidence of splenomegaly determined by ultrasound, hypersplenism determined by peripheral blood count and the presence of varices and/or portal gastropathy by upper gastrointestinal endoscopy (unless this has been done at the referring hospital within the previous 6 months or patient on prophylactic beta-blockers or previous TIPSS).

If the patient has not had a *surveillance* endoscopy in the previous 6 months then the transplant co-ordinator will arrange this on booking their admission. Prophylaxis should be commenced with carvedilol for grade II and III varices if identified.

Oesophageal variceal bleeding (or acute upper gastrointestinal bleeding of undetermined origin in the presence of varices) will be treated by repeated variceal banding or TIPSS.



## **5. Viral Hepatitis**

### **Hepatitis B and C**

Patients with hepatitis B and hepatitis C infections considered for transplantation must have assessment of the activity of viral infection. This will include measurement of HBsAg, anti HBc, HBeAg, anti HBe and HBV-DNA for hepatitis B infection. The Delta agent should be sought in all patients with hepatitis B infection by testing for delta antigen and anti-delta. Patients with Hepatitis C infections should have anti HCV, HCV-RNA including viral load and genotype checked. Patients who are HBV-DNA positive will be treated with oral anti-virals before and after transplantation. Ideally they should be HBV -DNA negative at the time of transplantation. Patients with HIV need to be discussed with Dr Daire O'Shea (Infectious Diseases, WGH).

## 6. Malignant Disease

Patients admitted for assessment with known hepatic malignancy should be discussed with the surgeons before admission and referred in parallel to the HPB MDT. This is done by completing the form on the intranet and forwarding to the HPB MDT coordinator on

[loth.riehpbmdt@nhslothian.scot.nhs.uk](mailto:loth.riehpbmdt@nhslothian.scot.nhs.uk). The referral to the HPB MDT should not delay admission for transplant assessment if this is required for other indications.

The hepatobiliary rota can be consulted for this purpose. The diagnosis of hepatocellular carcinoma will normally have been established by a combination of CT, MRI scanning and by alpha-fetoprotein measurements. **Biopsy of hepatocellular carcinoma should not be carried out where these investigations clearly point to the diagnosis to reduce the risk of tumour seeding.**

A lesion must be seen on 2 forms of imaging with typical characteristics to count as HCC. The size of a HCC will be the larger of the two if there is a discrepancy. The listing criteria at present are:

Single tumour < 5cm diameter **or**

Up to 5 tumours all < 3cm **or**

Single tumour between 5 and 7cm with *no evidence of progression* (<20% volume increase) over a six month period. Locoregional therapy or chemotherapy may be given at this time.

AFP < 1000 U/l

- A contrast CT scan will be carried out on ALL assessments. This can, and if possible should, be done at the referring hospital. The duty radiologist will report the scans here during the assessment week.
- MRI scan only for patients with suspected or proven HCC based on the initial CT scan.
- Patients *without* HCC will not have an MRI scan
- TACE (or RFA) will be offered to all patients on the waiting list with multifocal tumours, and all solitary tumours > 4cm, unless they have contraindications, eg poor synthetic function, or are likely to be transplanted very quickly.
- Patients on the waiting list with diagnosis including HCC should undergo alpha-fetoprotein (AFP) measurement at every clinic appointment and CT scanning every 4 months.
- Extra hepatic metastases should be sought with a chest x-ray, CT scan of chest and abdomen before listing.

## 7. Nutritional Assessment

All patients admitted for assessment are seen by the dietician. The nutritional assessment will categorize patients as being either well nourished, moderately malnourished or severely malnourished. Any patient that is unable to meet their nutritional requirements are considered for oral and/or enteral nutritional support as is appropriate. The anthropometric data collected on each patient includes:- Height (m), Weight (kg), Body Mass Index (kg/m<sup>2</sup>), Tricep Skinfold Thickness (mm), Mid Arm Muscle Circumference (cm), Grip Strength (kg) and Girth (cm).

## 8. Age

Advanced age is a relative contraindication to transplantation, and in such patients particular attention should be paid to an overall assessment of their general health.

## 9. Psychological State

Psychological evaluation is always required in patients with established or suspected alcoholic liver disease or substance misuse, and may be required in patients with other forms of liver disease.

Alcoholic Liver Disease/ Methadone Use Dr Smyth, (or Dr Nadine Cossett) should be informed about these patients when they are admitted to SLTU. UK guidelines exist (*Appendix 4 and 5*) for listing patients with alcoholic liver disease and substance misuse.

These patients will be asked to sign a contract relating to abstinence from alcohol and willingness to undertake prescribed treatment for alcoholism following transplantation (*Appendix 5*). Patients in whom alcohol is believed a co-factor in causing liver failure should also sign a contract. **Other patients considered appropriate for referral to Dr Smyth for reasons such as depression, previous drug misuse problems should generally be referred by the Consultant Physician on-call.** Quality of life is important in determining the need for transplantation, and sometimes may be the main indication where liver function otherwise seems reasonable. Dr Smyth should be contacted in the first instance about quality of life in patients where this is the major factor in consideration for transplant.

## 10. Social Support

Each patient being assessed for liver transplant should be seen by a Social Worker. Assessment priority will be given to patients referred through the MDTM, those with poor social support, known history of child or adult protection concerns, maladaptive coping strategies, mental health issues, addiction issues, carer or childcare issues.

## **11. Exclusion Criteria**

Systematic recording of the above should identify patients with exclusion criteria.

**Absolute contraindications** include:

Active extra-hepatic sepsis, extrahepatic malignancy, active alcohol or other substance abuse, and severe cardiac, respiratory or renal dysfunction not attributable to underlying liver disease, hepatocellular carcinoma > 7 cm diameter, a predicted 5-year survival of <50% post-OLT.

**Relative contraindications** include:

Age > 65 years, previous major upper abdominal surgery, portal vein thrombosis, diabetes mellitus with complications, and moderate cardiac, respiratory or renal dysfunction not related to the underlying liver disease. Previous alcohol or substance abuse and poor social circumstances are also relative contraindications.

## **12. Care of Assessment Patients with Specific Liver Related Problems (*Appendix 7*)**

Specific liver related problems are managed as per guidelines in the Centre for Liver & Digestive Disorders: Clinical Care Guidelines for Junior Doctors, last updated 2015.

## **DECISION REGARDING LIVER TRANSPLANTATION**

All patients are discussed at the weekly transplant meeting and decisions will take account of the views of the medical staff, nursing staff, social workers, transplant co-ordinators and dietician. The transplant co-ordinator will be responsible for ensuring that a completed assessment form (*Appendix 2*) and the patient's SLTU and referring hospital records are available at this meeting. This meeting will decide on the advisability of transplantation and its urgency. Patients accepted for transplantation and their relatives will be informed about the transplantation and will be counselled. Patients rejected will be made aware of their right to a second opinion and the potential mechanisms for this. The discussion details of both the assessment meeting and patient consultation are recorded on the assessment summary sheet on the day of the assessment meeting (*Appendix 3*). This is filed in the patients notes.

The outcome of the assessment will be e-mailed to the referring clinician following the meeting.

### **Follow-up on waiting list**

Arrangements for medical follow-up for patients on the waiting list and for patients in whom a decision on transplantation has been deferred must be made clear to the referring consultant, the general practitioner and the patient. Patients who are not accepted for transplantation are referred back to the referring consultant.

### **Varices**

Patients who have had previous variceal bleeding need to have follow-up arrangements made for variceal banding or TIPSS surveillance. Patients who have not had previous variceal bleeding who are discharged on the transplant waiting list and who have medium or large varices will be treated with carvedilol or with banding.

### **Bone Density**

Patients with untreated osteoporosis (T score < -2.5) will receive an intravenous bisphosphonate such as zoledronic acid.

### **Hepatitis C Treatment**

If a patient is listed for HCC with Childs A cirrhosis and HCV infection then direct acting anti-viral therapy should be given according to national guidelines. This should be undertaken by the referring unit.

Patients with de-compensated disease in general will benefit from transplantation and treatment is considered on a case by case basis.

## Appendix 1



### SCOTTISH LIVER TRANSPLANT UNIT

Royal Infirmary of Edinburgh, 51 Little France Crescent, Old Dalkeith Road, Edinburgh, EH16 4SA

#### LIVER TRANSPLANT ASSESSMENT REFERRAL FORM

Date:

#### ***Patient information:***

Name: \_\_\_\_\_ CHI: \_\_\_\_\_ Height: \_\_\_\_\_  
Address: \_\_\_\_\_ Weight: \_\_\_\_\_ BMI: \_\_\_\_\_

Telephone number:

#### ***Clinical information:***

Diagnosis:

Other relevant medical / surgical information:

Living independently at home and mobile: Y/N

Relative/friend able to attend with pt : Y/N

Is pt able to fund outpatient assessment: Y/N

Alcohol misuse: current/previous/never

Smoking: current/previous/never      Substance misuse: current/previous/never

#### ***Indication for assessment:***

Liver Failure: (UKELD >49): Y/N

HCC: single lesion <5cm or up to 5 lesions less than 3cm: Y/N      AFP: \_\_\_\_\_

Variant syndrome:

Hepatopulmonary syndrome: arterial Po<sub>2</sub> less than 7.8 kPa: Y/N

Diuretic resistant ascites: Y/N

Chronic encephalopathy: 2 hospital admissions in the previous year: Y/N

Polycystic liver disease: intractable symptoms / portal hypertension: Y/N

Intractable and persistent pruritus: Y/N

#### ***Complications of cirrhosis:***

Oesophageal varices: Y/N

Previous variceal bleed: Y/N

Date of last endoscopy:

Treatment:

Encephalopathy: Y/N    Grade:

Treatment:

Ascites: Y/N

Treatment:

**Imaging:**

CT: Y/N	Date:	Result:
MRI: Y/N	Date:	Result:
Available on national archive: Y/N		

**Referral:**

Named Consultant:	Phone number:
	Email address:
	Secretary contact details:
Hospital:	
Date patient informed of diagnosis and referral for assessment:	
Have you discussed this patient with a Transplant Hepatologist, if so whom?	

Please email the referral form to:- [SLTU@nhslothian.scot.nhs.uk](mailto:SLTU@nhslothian.scot.nhs.uk)

If you have any questions please contact:-  
Liver Recipient Transplant Co-ordinator - 0131 242 1721  
Liver Transplant Secretary - 0131 242 1719/0131 242 1717.

Our website is:- [www.edinburghtransplant.org](http://www.edinburghtransplant.org)

**For transplant use only:**

Date received:	
Consultant referred to:	
Outcome:	Not for assessment: Refer back to named consultant
	In-patient assessment: Date:
	Outpatient assessment: Date:
	Clinic appointment: Date:
Coordinator signature:	Date:
<i>Version 2 – 25<sup>th</sup> February 2015</i>	

Appendix 2 Consultants: Assessment for Liver Transplant Date:

Name:	Date of Birth:	Age :	Blood Gp: Rh:
Diagnosis:	Duration of disease: yrs	Allergies:	
Other significant disease(s):		Previous Surgery:	

<b>Blood</b>	Hb	Na	Bilirubin	Ca	pO <sub>2</sub>
	WBC	K	ALT	Albumi	pCO <sub>2</sub>
	Plat	CO <sub>2</sub>	Alk	Glucose	H+
	MCV	Urea	GGT	αFP	INR
	PT	Creat	Protein		eGFR:

<b>Urine Results:</b>	Urinary Na:	Creat Clearance:
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<b>Complications of cirrhosis:</b>	Encephalopathy:	
	Varices:	
	Date of Last Endoscopy	
	Bleeding Varices:	
	Ascites:	

MRI	
CT	

ECG:	
Echocardiogram:	

**Pulmonary Function Tests:**

	FEV <sub>1</sub>	VC	Ratio	Tco	Comments	AT
Actual						
Pred						VO <sub>2</sub> Workload:

<b>Bacteriology:</b>	Urine:	Ascities
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<b>Virology:</b>	CMV	HIV	Previous TB
	HCV	HBs Ag	EBV:

Height	Weight	Subcostal girth	cm	HLA :
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<b>Nutrition:</b>		<b>Anthropometry</b>	TSF	MAC	%	MAMC
<b>BMI:</b>						

UKELD: TBS:



**Appendix 3**

**Transplant Unit  
Assessment Meeting Summary Document**

Date of Assessment Meeting:	Patient Address Label
<b>Summary of relevant issues from assessment week</b>	
<b>Physician:</b>	
Sign	Print
<b>Surgeon:</b> suitable for DCD    Y/N       split liver    Y/N	Date
Sign	Print
<b>Anaesthetist:</b>	
Sign	Print
<b>MDT Discussion:</b>	
Sign	Print
<b>Discussion with patient (+/- carers):</b>	
Sign	Print
Date	

## Appendix 4

### **CONTRA-INDICATIONS TO LISTING -ALCOHOL**

- Alcoholic hepatitis
- More than two episodes (within 2 years) of non-adherence with medical care where there was not a satisfactory explanation. Non-adherence with medical care should not be confined to management of their liver disease, but includes management of their alcohol abuse as well
- More than two episodes (within 2 years) of return to drinking following full professional assessment and advice
- Concurrent or consecutive illicit drug use (except occasional cannabis use)
- Evidence of drinking whilst on the transplant list will result in permanent removal from the list. Patients should be informed on entry to the list that this will occur if they drink whilst waiting for their transplant

## Appendix 5.

### **UK LIVER TRANSPLANT GROUP RECOMMENDATIONS FOR LIVER TRANSPLANT ASSESSMENT IN THE CONTEXT OF ILLICIT DRUG USE**

#### **2 Assessment**

- Patients admitted for a transplant assessment irrespective of diagnosis should be screened for current and past illicit substance use as part of the clinical interview. This should include misuse of over the counter medications (OTCs) and apparent misuse of pain relief medication
- Any patient considered to have a significant drug taking history should be assessed by a specialist in substance misuse; the term 'significant' must be interpreted by the clinical, multi-disciplinary team
- Adequate time and resources should be made available to allow this specialist to undertake this process
- Assessment should include problematic or dependent use as well as recent use. It should also identify substance use and stability within the patient's wider social support network, and take into account mental health and criminal justice issues as appropriate
- Services should endeavour to develop and implement joint screening and assessment protocols between hepatology and substance misuse services to ensure effective care pathways are in place.

#### **2.1 Contraindications**

Contraindications to listing for transplantation include the following:

- I. Current ongoing intravenous use of illicit or non-prescribed substances
- II. Two or more recent (within 2 years) incidences of unexplained and significant non compliance with treatment – not necessarily confined to the management of liver disease
- III. Current failure to comply with the assessment and treatment process for transplantation, including refusal to provide consent for gaining access to information pertaining to drug treatment and prescribing
- IV. Recent past history of cross dependency (substituting from one drug to harmful/problematic use of another), within the last 2 years; this requirement could be relaxed for patients who have switched drugs within 2 years but have been stable since maintaining engagement in substance misuse services
- V. Length of abstinence should be 2 years ideally, but not less than 6 months, where a patient has been dependent on a drug. The patient should have the opportunity to engage in an optimum substance misuse treatment programme.

#### **2.2 Potential Contraindications**

Potential contraindications allow issues of concern to be factored in without necessarily attempting to weight issues against one another in the absence of good evidence. The importance of potential contraindications should be discussed between the transplant team and substance misuse specialist and interpreted with clinical judgement on a case by case basis.

- I. Current legally prescribed intravenous drug use (i.e. Diamorphine or Physeptone). Some patients are long term yet stable IVDUs and their use of prescribed IVDU opiates is as part of a long term agreed treatment plan. Others may be more recent presentations who have failed on an optimum treatment programme but are a high risk group. Assessment here needs to be done by a specialist
- II. Insufficient social support network to remain abstinent from illicit drugs, and where it is not possible to work with the patient to facilitate a suitable and acceptable social support package

- III. Lack of motivation to move away from drug using culture/area, within the confines of opportunity
- IV. Current illegal drug use
- V. Past history of cross dependency (substituting from one drug to harmful or problematic use of another, within the last 2-5 years)
- VI. Reluctance to agree to drug treatment and after-care or to sign a treatment agreement
- VII. Active ongoing alcohol use in the presence of HCV, where there is clear evidence of medical advice to become abstinent.

### **3 Transplantation and Substitute Prescribing**

The recommendations regarding this area are given in the context of limited research data. Small studies are favourable to consideration of transplantation whilst on a substitute prescription e.g. Methadone maintenance therapy (MMT).

Analgesia post transplantation will need careful consideration and may require an agreed plan between the anaesthetist, pain team and substance misuse specialist. Awareness of potential issues relating to patient controlled analgesia (PCAs) will also be required, and risk factors should be assessed and a local management plan effected accordingly. The potential for misuse should be balanced with the knowledge that opiate tolerant patients are likely to need higher doses than an opiate naive person.

#### **3.1 Methadone**

MMT is a safe, well evidenced treatment for patients unable to become opiate free. It is commonly a long term treatment. Patients on a stable MMT should be offered assessment for transplantation where medically indicated. Stability - individually measured as a continuum, not an absolute - indicates abstinence from other illicit drug use (predominantly other opiates, stimulants – including cocaine and crack cocaine). There should be treatment engagement with a drug treatment service and the patient should have an agreed care plan and a named key worker (though it should be acknowledged that it is now common practice to transfer stable patients to GP management. MMT patients should not be asked to reduce their methadone simply for the purpose of transplantation as this has the potential to destabilise them and provoke a relapse to other drug use.

Evidence suggests the likelihood of a prolonged ITU stay post transplant and the requirement for larger doses and longer treatment for post-operative analgesia.

#### **3.2 Buprenorphine**

The same requirements apply in the context of substitute prescribing as for MMT (as in 3.1). Due to its method of action as a partial opioid agonist-antagonist there will be issues around peri-operative analgesia. Where possible, conversion to methadone peri-transplant will assist with this issue. This should be undertaken in consultation with a substance misuse specialist.

#### **3.3 Prescribed I/V Diamorphine or Physeptone**

Where clinically possible, conversion to oral substitution therapy should be considered, in view of concerns including venous access and sepsis. This decision needs consideration and team discussion incorporating the patient and substance misuse specialist.

### **3.4 Benzodiazepines**

Careful assessment should be made where there is past or current significant use of benzodiazepines – whether prescribed or illicit – and the context of this use. Replacement of opioids and alcohol with benzodiazepines can occur, and thus their use might mask a relative risk to relapse. It is worth noting that benzodiazepines are also associated with high risk behaviours and cognitive and memory impairment, and so their use may actively trigger relapse.

## **4 Drug Screening**

Drug screening should be arranged where there is concern about concurrent illicit drug use. Where a patient is on MMT they should be undergoing drug screening as part of their programme with the substance misuse team, and consent to obtain drug test results from the substance misuse team should be given. A positive screen for illicit drugs (except cannabis) prior to transplant is a contraindication to listing. Post transplant a positive screen is a clear prompt for intervention and support. Whether drug testing is via mouth swab or urinalysis, and whether it is a supervised process or not will depend on the practice of individual units.

### **4.1 Drug Screening and Alcohol Agreements**

These should be undertaken on the basis of past history or where there is perceived risk of alcohol being used to substitute for other drugs (commonly opioids). This approach to testing requires each unit to consider its approach to the process of screening questions for alcohol and drug use and referral to the substance misuse specialist. Blood alcohol levels can be taken during blood tests or randomly requested. A “drugs of abuse” screen can be undertaken with a urine sample via the toxicology laboratory. All patients assessed for transplant listing should give explicit consent to future drug and alcohol testing from this period onward, as considered appropriate by the unit.

## **5 Treatment Agreement**

A treatment agreement is recommended as a useful process for a number of reasons. It can outline a statement of intent including treatment engagement, commitment to the programme and consent to share appropriate information with relevant agencies. Any potential consequences to non-concordance with the treatment agreement (e.g. non-attendance, refusal of or positive drug screens) should be made clear in the agreement. Past behaviour documented in a comprehensive assessment is a better guide to stability and engagement than the signing of a treatment agreement. Consent should be part of a treatment plan.

## **6 Post Transplant Follow-up**

It is recommended that follow-up with the local drug/support services – where required - is explicit in the agreement and should also form part of the care plan at the substance misuse service. Follow-up within the transplant programme should also clearly monitor and document substance use – preferably with monitoring by a substance misuse specialist – and the transplant team should actively encourage referral to and engagement with substance misuse services in the event of a relapse.

## **8 Outcome Monitoring**

In order to monitor the outcome of transplant listed patients with a significant illicit drug history, appropriate clinical data should be recorded. Consent for this to occur should be given at the same time as the drug and alcohol screening.

**Appendix 5 ALCOHOL CONTRACTS**

**1. For patients where alcohol is the only cause of liver disease**

**SCOTTISH LIVER TRANSPLANTATION UNIT**

Secretary 0131-242 1719

Fax No. 0131-242 1739

**ALCOHOL AND YOUR LIVER**

**Name:**

Date:

**Address:**

We believe you have developed liver failure because of damage caused by excessive drinking. As part of our assessment you will see a psychiatrist and a social worker, and you will require investigations to rule out damage caused to other organs by alcohol.

We do not know at this stage whether a liver transplant will be necessary or appropriate for you. Sometimes liver disease can improve considerably if the patient stops drinking completely - even when their disease is quite advanced. If you are one of these patients then a liver transplant may be unnecessary, but continuing to abstain from alcohol will be very important. In these circumstances we can arrange help for you by placing you in contact with one of your local alcohol counselling services, depending upon what is available and your wishes.

Equally, it is of enormous importance for your future health to stop drinking completely if you are placed on the waiting list for a liver transplant, both before and after transplantation. In these circumstances we believe you have a responsibility to cooperate as far as further drinking is concerned. We make the following requirements:-

- 1) You will be required to sign a formal undertaking not to drink alcohol again.
- 2) You must be prepared to cooperate with any alcohol rehabilitation programme that is recommended by medical staff. This will not apply to all patients, but it will be our decision rather than yours whether it will apply to you.

**After Transplant:-**

- 3) Your subsequent medical follow-up will include occasional interviews with our alcohol nurse counsellor.
- 4) There will be occasional random testing for alcohol in your blood or urine.

**2. For patients where alcohol and another process have contributed to the of liver damage**

**SCOTTISH LIVER TRANSPLANTATION UNIT**

Secretary 0131-242 1719

Fax No. 0131-242 1739

**ALCOHOL AND YOUR LIVER**

**Name:**

Date:-

**Address:**

We believe you have developed liver failure which has been contributed to by excessive drinking. As part of our assessment you will see a psychiatrist and a social worker, and you will require investigations to rule out damage caused to other organs by alcohol.

We do not know at this stage whether a liver transplant will be necessary or appropriate for you. Sometimes liver disease can improve considerably if the patient stops drinking completely - even when their disease is quite advanced. If you are one of these patients then a liver transplant may be unnecessary, but continuing to abstain from alcohol will be very important. In these circumstances we can arrange help for you by placing you in contact with one of your local alcohol counselling services, depending upon what is available and your wishes.

Equally, it is of enormous importance for your future health to stop drinking completely if you are placed on the waiting list for a liver transplant, both before and after transplantation. In these circumstances we believe you have a responsibility to cooperate as far as further drinking is concerned. We make the following requirements:-

- 1) You will be required to sign a formal undertaking not to drink alcohol again.
- 2) You must be prepared to cooperate with any alcohol rehabilitation programme that is recommended by medical staff. This will not apply to all patients, but it will be our decision rather than yours whether it will apply to you.

**After Transplant:-**

- 3) Your subsequent medical follow-up will include occasional interviews with our alcohol nurse counsellor.
- 4) There will be occasional random testing for alcohol in your blood or urine.

## SCOTTISH LIVER TRANSPLANTATION UNIT

Secretary 0131-242 1719

Fax No. 0131-242 1739

### ALCOHOL AND YOUR LIVER

**Name:**

Date:

**Address:**

#### INFORMATION SHEET FOR THE CONTRACT

This letter introduces an important document which we want you to consider carefully. It is not a legally binding contract - rather it is a pledge, a promise, a solemn undertaking we want you to make which we hope will ensure you will not drink alcohol in future.

We regard it as essential that you never drink again because we know that the outlook is bad for you if you do. We would also remind you that a transplant is living tissue from a dead individual whose family have agreed to this donation, and we believe you have a responsibility to them. Finally, if patients with liver transplants return to drinking the public are put off donating organs, and we can transplant nobody without the consent of our donors' families.

This document represents your side of the bargain we are striking - in return you will be listed for transplant and treated by our unit. We cannot give you a guarantee that you will have a liver transplant but we can assure you that it is very likely - and only the lack of a suitable donor or the development of a medical contraindication will prevent this. On the other hand if you are unwilling to agree to our conditions and sign this document it is unlikely we will take a chance with you.

We recognise this is a major commitment for you to make and you can take as much time as you need to make up your mind. We want you to take at least 24 hours and we want you to discuss this with close family members. You may also wish to discuss this with your family doctor or perhaps the hospital specialist who referred you to us. Of course we will be willing to answer any questions you may have.



**SCOTTISH LIVER TRANSPLANTATION UNIT**

Secretary 0131-242 1719

Fax No. 0131- 242 1739

**CONTRACT**

**Name:**

Date:

**Address:**

**ALCOHOL AND YOUR LIVER**

I solemnly agree to abide by the following requirements:

- 1) I will never drink alcohol again.
- 2) I am willing to cooperate with an alcohol rehabilitation programme if this is considered necessary by medical staff.
- 3) I agree to interviews with an alcohol nurse counsellor at the Royal Infirmary as part of my medical follow-up.
- 4) I understand and agree that there will be occasional random testing for + alcohol in my blood or urine.

Signed: .....

Name: .....

Dated: .....

Witnessed: .....

Name: .....

**1) Before referral**

- 1) All patients should have an ECG and Transthoracic echo within last 3 months.
  - a. Transthoracic echocardiogram must include **full** report including estimation of tricuspid regurgitation pressure gradient (TRPG) and pulmonary artery pressure if TR present.
- 2) Patients should be referred for local Cardiology assessment if:
  - a. ECG evidence of myocardial ischaemia / left bundle branch block / previous myocardial infarct
  - b. Echocardiogram suggestive of LV dysfunction.
  - c. Known coronary heart disease or heart failure

**2. Referral**

- 1) Referral letter must include the following information to allow risk stratification and admission for enhanced cardiovascular work up.
  - a. Presence/ Absence of the following

**Risk factors**

- Age >60
- Smoker (within last 5 years)
- NAFLD
- Diabetes Mellitus (any type)
- Intrinsic renal disease (Creat >170)
- FHx of IHD before age 60 in 1<sup>st</sup> degree relative
- Hypertension
- Hypercholesterolemia

**History or symptoms of**

- Coronary Heart Disease
- Heart Failure
- Cerebrovascular disease
- Peripheral Vascular disease

- b. Hard copies of all Cardiac Ix (ECG/Echo/other)
- c. Local Cardiologists opinion if sought

## Cardiovascular Risk Assessment for Liver Transplantation

### Arranging admission to SLTU (hepatologists/coordinators)

- 1) Risk assessment from referral documentation
  - Coordinators may need to contact patient

a) The following groups need enhanced cardiovascular work up.

<p><b>Patients with 2 or more below</b></p> <ul style="list-style-type: none"><li>-Age &gt;60</li><li>-Smoker (within last 5 years)</li><li>-NAFLD</li><li>-Diabetes Mellitus (any type)</li><li>-Intrinsic renal disease (Creat &gt;170)</li><li>- FHx of IHD &lt; 60years in a 1<sup>st</sup> degree relative</li><li>- Hypertension</li><li>- Hypercholesterolaemia</li></ul>	<p><b>Or</b></p> <p><b>Highlighted as high risk from referring centre</b></p> <ul style="list-style-type: none"><li>- Abnormal ECG/Echo/ Local cardiology opinion</li></ul>	<p><b>Or</b></p> <p><b>Any History/ Symptoms of</b></p> <ul style="list-style-type: none"><li>- Coronary Heart Disease</li><li>- Heart Failure</li><li>- Cerebrovascular disease</li><li>- Peripheral Vascular disease</li></ul>
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- 2) Arrange admission date for enhanced cardiovascular workup (coordinators)

- a) Monday admission slot
- b) Refer for ring fenced Tuesday pm CPX (Shaun.Baxter@nhslothian.scot.nhs.uk)
- c) Refer Cardiology (Lynn McKinlay (phone 242 6515)/ Prof Newby / Dr Japp ( mobiles )

### Admission to SLTU (team for the week)

- 1) Get hard copies of investigations done locally and put in transplant notes
- 2) Book echo if required
- 3) Confirm CPEX slot Tues pm (Shaun.Baxter@nhslothian.scot.nhs.uk)
- 4) Confirm appointment with Professor Newby (Lynn 242 6515) or Dr Alan Japp (mobile)
- 5) Ensure ECG/ Echo/ other Ix and CPX result in notes for Cardiology review

### Cardiology review

- a) Local investigation if required before listing (CTCA or coronary angiogram)
- b) Recommendation on medical therapy (aspirin/statin / b blocker)

## Appendix 7

### Guidance for Care of Specific Liver Related Disorders.

Excerpts from the **Clinical Care Guidelines for Junior Doctors** with permission of Dr Carol Blair, Consultant Hepatologist

**ALL PATIENTS** admitted to the ward need to be **FULLY clerked**.

Patients transferred from other units (including CAA) need to be reviewed, check kardex, fluid prescriptions, UPR completed and recent blood results are available and acted on. Check old notes have been requested and all investigations have been requested e.g. UGIE, ultrasound or full liver screen. Patients who are 'stepped down' from critical care must be reviewed by **FY2 level doctor or above**.

***THIS IS THE RESPONSIBILITY OF THE WARD DAY STAFF AND SHOULD NOT BE LEFT FOR DOCTORS WHO ARE COVERING THE WARD OUT OF HOURS.***

**Salient points in the history that should be documented for all patients:-**

Full history and systemic enquiry

Aetiology and accurate time course of illness

Episodes of decompensation (e.g. ascites, variceal bleed and encephalopathy)

Details of biopsy and relevant treatments

Accurate current and recent drug history

Full family and social history (particular attention to alcohol history)

All patients with ascites should have a diagnostic tap performed on admission to the ward if this has not been performed prior to transfer of the patient. This should be sent for biochemical and microbiological analysis (WCC count and urgent gram stain) with the **RESULTS DOCUMENTED CLEARLY IN THE EPR**.

## Preparation of patients for Endoscopic/radiological GI procedures

- All endoscopy requests should be completed on TRAK. If you do not know how to do this please ask.
- Please complete the endoscopy request forms with care;-
  - ALL REQUESTS FOR HIGH RISK PATIENTS should be clearly marked.
  - Relevant MEDICAL HISTORY e.g. diabetes, IHD, prosthetic heart valves or previous SBE, haemophilia (very important for endoscopy) should also be listed.
  - relevant DRUG HISTORY e.g. NSAIDs, oral anticoagulants, clopidogrel, insulin
  - relevant INVESTIGATIONS- especially for ERCP patients.
- ALL PATIENTS should have a **working cannula**
- ALL PATIENTS with liver disease should have a FBC and INR checked prior to the procedure with the results documented clearly in the case notes. All patients with moderate coagulopathy should be discussed with senior staff as reversal of coagulopathy with blood products may be required prior to the procedure if therapeutic interventions may be needed.
- ALL PATIENTS should be FASTED FROM MIDNIGHT on evening prior to procedure or if on afternoon list, patients can have LIGHT BREAKFAST ONLY at 8am and then fast until the procedure.

**UGIE / ENDOSCOPIC ULTRASOUND-** If patient on morning list, all oral medications (**EXCEPT ORAL DIABETIC DRUGS**) should be withheld till after the procedure.

**ERCP-** antibiotic prophylaxis is not usually required. Amoxicillin 1g and gentamicin 2g/kg should be given 1 HOUR PRE-PROCEDURE to all patients with pancreatic pseudocyst or at request of endoscopist – if in doubt check with Reg/Cons.

**COLONOSCOPY-** The bowel preparation of choice for colonoscopy is MOVIPREP. Please prescribe for all inpatients having lower GI procedures.

## Practical procedures at the bedside

Informed consent should be obtained and platelet count and prothrombin time checked prior to all procedures.

In patients who are being admitted regularly for paracentesis, bloods (including LFTs and renal function) should be taken prior to the procedure but it is not necessary to wait for the results before carrying out the procedure.

Aseptic technique should be adopted for all invasive procedures.

All procedures should be documented clearly in EPR. In particular, the colour of ascitic fluid should be documented in addition to any immediate complications.

## Diagnostic ascitic tap

Should be performed in all patients with ascites on admission and if sepsis/ SBP is suspected. To minimize complications, avoid areas of prominent veins, infected skin or scar tissue.

- 1) Correctly position patient -lying supine with one pillow (if gross ascites present) or at 30° elevation (moderate ascites).
- 2) Area at right or left iliac fossa (5cm superior and medial to anterior superior iliac spine) should be marked after suitable percussion note is detected.
- 3) Clean skin with antiseptic solution and apply a sterile drape.
- 4) Using a 20ml syringe and 18 gauge needle advanced slowly aspirate every 0.5cm to determine when the peritoneum is entered and ascitic fluid aspirated freely. The procedure should be abandoned or another site attempted if fluid cannot be freely aspirated.
- 5) Once 20mls of fluid has been aspirated withdraw the needle and syringe and apply a dressing to the area.
- 6) Fluid should be sent for: BIOCHEM- protein, albumin, MICROBIOLOGY- urgent gram stain and WCC count and culture. 5ml of fluid should also be inoculated into a pair of **blood culture bottles**- this greatly improves the chance of organism identification and obtaining sensitivities (same TRAK label for all 3 micro samples).
- 7) If malignancy is suspected then a sample should also be sent for CYTOLOGY (ideally a large amount of fluid obtained at paracentesis rather than fluid obtained at time of diagnostic tap).

## Insertion of paracentesis drain

**All patients should have empty bladder prior to procedure.**

- 1) Position patient -lying supine with one pillow (if gross ascites present) or at 30° elevation (moderate ascites)
- 2) Mark site of drain insertion. **PREFERRED SITE OF DRAIN INSERTION IS 2-3CM BELOW UMBILICUS.**
- 3) Wash hands and put on sterile gloves. Clean skin with antiseptic solution and apply sterile drape.
- 4) Using 5ml syringe and 25 gauge needle draw up 5mls of 1 or 2% lignocaine.
- 5) After infiltrating the skin, advance needle towards peritoneum, alternating aspiration and injection until ascitic fluid is noticed to be aspirated freely. Note depth at which the peritoneum is entered.
- 6) Use a scalpel blade to make a small nick in the skin to allow easier insertion of the bonanno catheter.
- 7) Assemble bonanno catheter and you may wish to attach a 10ml syringe.
- 8) Insert bonanno catheter gradually (5mm increments) with the needle directly perpendicular to the entry point on the skin. Continually apply negative pressure to the syringe as the needle is advanced. Entry into the peritoneal cavity is associated with loss of resistance and free aspiration of ascitic fluid. Now advance catheter over the needle into the peritoneal cavity. **IF ANY RESISTANCE IS FELT THEN ABANDON THE PROCEDURE AS THE CATHETER IS LIKELY TO BE MISPLACED.**
- 9) If safe to do so, advance catheter fully while withdrawing the needle and then attach drainage bag. Secure drain in place with tegaderm dressings or 2 sutures followed by a dressing.
- 10) Dispose of all sharps safely and prescribe a fluid replacement regimen.  
Usually **1 bottle of 20% HAS is given for every 3 litres drained.**
- 11) Drainage should be free (i.e. rapid) and the drain removed at 8-10 hours if paracentesis complete i.e. drainage of ascitic fluid has virtually ceased. If not, it is reasonable to leave the drain in longer but it should ideally be removed by 16 hours. It is important that those attending for regular paracentesis are drained to dryness if possible.
- 12) If there is ongoing leakage from the drain site a stoma bag is applied. Losses from here should also be recorded and if this brings total losses to a 3L increment mark then further bottle of HAS should be given.

## COMMON PROBLEMS ON THE WARD

### FEVER

- Not every fever will be sepsis e.g. alcoholic hepatitis
- Sepsis will not always be accompanied by fever. Think of sepsis also when unexplained ↓ in BP and ↑ in HR or unexplained deterioration in patient condition e.g. ↓ GCS or ↓ urine output.
- NB hypothermia may be presenting feature of sepsis in patients with liver disease

What to do:-

- 1) Examine patient looking for sites of infection (chest, urinary tract, abdomen and lines/venflons/catheters)
- 2) Carry out a full sepsis screen which includes blood cultures, MSU, sputum, ascetic tap, and swab any breaks in the skin esp. old cannula sites. Stool cultures if associated GI upset and update CXR only if respiratory symptoms or signs present.
- 3) Consider commencing antibiotics based on likely source (see Lothian antibiotic prescribing guidance) if source unclear and patient unwell commence IV TAZOCIN 4.5G tds and if known to be MRSA positive consider adding vancomycin.

**Seek formal microbiology advice at earliest opportunity.**

### INCREASING CONFUSION

- Not all confusion in patients with liver disease is due to encephalopathy
- Don't forget possibility of alcohol withdrawal
- Not all intracranial pathology results in localising signs

What to do:-

- 1) Full neurology examination. Document any signs of external head injury
- 2) Document any hepatic flap/ fetor and **CHECK SPOT GLUCOSE**
- 3) Examine for any signs of sepsis and carry out full sepsis screen. Consider supplementary IV fluids and broad spectrum antibiotics (as detailed above).
- 4) If acute ↓ in GCS or seizure activity or localising neurological signs- consider **URGENT CT HEAD** to exclude SOL, ICH or subdural haematoma.
- 5) Regular neuro obs with early critical care referral if airway not protected.



## LOW Na+

- A low serum Na<sup>+</sup> rarely indicates depletion of whole body Na<sup>+</sup>.
- Symptoms and signs relate to rate of onset rather than the degree of hyponatraemia.
- In most patients with liver disease the cause will be diuretic use or cirrhosis

What to do:-

- 1) Assess volume status of patient and check serum and urinary osmolality and urinary Na<sup>+</sup>.
- 2) Review previous biochem results to assess rate of fall in Na<sup>+</sup>. If not related to liver disease or diuretic use, then check serum glucose (exclude ADDISON'S DISEASE), TFTs (exclude HYPOTHYROIDISM) and consider CXR if no recent CXR (exclude SIADH).
- 3) Management depends on degree of hyponatraemia and rate of fall. If Na<sup>+</sup> <125 mmol/l then stop diuretics. If Na between 115 and 125 then administer 20% HAS 3 bottles/day until Na >125. If Na < 115 then fluid restrict to 1 Litre daily in addition to albumin administration.

## POOR URINE OUTPUT

- More than one aetiology may be present at one time e.g. volume depletion (including bleeding, excess diuretics, poor oral intake), sepsis, drug toxicity.
- Hepatorenal syndrome is common in patients with chronic liver disease and can result in significant morbidity and mortality.

What to do:-

- 1) Assess volume status of patient (clinically and by reviewing fluid balance charts for previous 24-48 hours).
- 2) Examine patient for signs of sepsis or GI blood loss.
- 3) Check U&Es.
- 4) If clinically hypovolaemic → **stop diuretics** → **iv fluid challenge** with HAS 4.5%/plasmalyte
- 5) Consider catheterisation
- 6) Consider empirical broad spectrum antibiotics if underlying sepsis is a possibility.

If no improvement occurs then discuss with senior colleagues as CVP monitoring +/- inotropic support may be required.

## COMMON LIVER CONDITIONS / RELATED PROBLEMS

### SPONTANEOUS BACTERIAL PERITONITIS (SBP)

Often asymptomatic

Common cause of confusion/ encephalopathy/ sepsis

Common in hospital in-patients

Defined as a neutrophil count **>250/mm<sup>3</sup> in ascitic fluid**, in the absence of an obvious source of peritonitis (e.g. bowel perforation). (If patient has recently been treated with antibiotics or is on SBP prophylaxis the neutrophil count may not be as high as 250/mm<sup>3</sup> but they may still have SBP.)

**Diagnosis:**-diagnostic ascitic tap. Ascitic fluid should be sent for **urgent gram stain, WCC count and M, C+S (5mls universal container and set of blood culture bottles should be sent to micro)**. Bedside inoculation of ascitic fluid to blood culture bottles will increase bacterial yield. Presence of >1 type of organism should raise the possibility of intra abdominal pathology

**Treatment:-**

- **IV TEMOCILLIN, METRONIDAZOLE AND AMOXICILLIN** (reduce dose in renal impairment), modify antibiotics once bacteriology result is known
- **IV HAS (1.5g/kg day 1; 1g/kg day 3)**

**Prophylaxis** with cotrimoxazole (septrin) 960mg od is recommended for ALL PATIENTS following SBP and all patients with ascitic protein concentration <15g/L. Septrin can cause bone marrow suppression and dose may be reduced in patients with pancytopenia.

### HEPATORENAL SYNDROME (HRS)

- Patients with liver disease can develop renal impairment for numerous reasons e.g. pre-renal (excess diuretic use, sepsis, haemorrhage, inadequate volume replacement post paracentesis), nephrotoxic drugs (GN, ATN).

**NOT** all renal impairment in patients with liver disease is due to HRS

Defined as *“a clinical condition that occurs in patients with chronic liver disease, advanced hepatic failure and portal hypertension characterised by impaired renal function and marked abnormalities in the arterial circulation and activity of the endogenous vasoactive systems. In the kidney there is marked renal vasoconstriction that results in a low GFR. In the extra-renal circulation there is predominance of arterial vasodilatation...”*

**For the diagnosis of HRS to be made ascites must be present**

## **Types of HRS:-**

**Type 1** = a rapid deterioration with doubling of serum creatinine to > 2.5 mg/dl (220 µmol/l) or a reduction in creatinine clearance of >50% within two weeks (survival is 2-3 weeks without renal replacement therapy or OLT).

**Type 2** = a more moderate or stable reduction in renal function

## **Treatment of HRS: -**

1. Exclude causes of pre-renal failure
2. Ensure adequate filling with intravenous albumin (CVP monitoring often helpful): if no improvement in renal function-
3. Consider the use of vasoconstrictors, particularly terlipressin initially 0.5-1mg qds increasing to 2 mg qid if no response. Be aware of contraindications to terlipressin including IHD and PVD. Patients must be adequately filled prior to terlipressin use.
4. If these fail consideration should be given to the use of renal replacement therapy (RRT) although it is appropriate only in a minority of patients.

**Decisions about RRT should be made long before it is required clinically**

## **ENCEPHALOPATHY**

- **Clinical signs can vary greatly e.g. from mild confusion to coma**
- **Diagnosis is made on clinical grounds- EEG rarely required**

### **What to do: -**

- 1) **Investigation and management as for confused patient** (refer to earlier section).
- 2) Stop diuretics for 24-48 hours and look for obvious precipitants e.g. sepsis, UGI bleeding, dehydration, constipation, drugs
- 3) Phosphate enemas BD +/- oral lactulose
- 4) Consider broad spectrum antibiotics once cultures taken
- 5) Early ITU referral if airway not protected

**If recurrent encephalopathy occurs in patients with TIPSS, consider shunt revision.**

## Protocol for Albumin Administration in Cirrhosis in ward 205.

Albumin is available in 2 volumes/strengths:

1. **500ml bottles of 5% (10g albumin, 75 mmol sodium)**
2. **100 ml bottles of 20% (8g albumin, 15 mmol sodium)**

Except when using albumin as volume replacement for hypovolaemia, the 20% strength has advantages in terms of cost (it is 20% cheaper) and in terms of sodium load (it has only one fifth as much sodium). Therefore....

- use the **5% strength** if the patient is **hypovolaemic** (definite or suspected)
- In all other circumstances use the **20% strength**.

For example:

1. Albumin replacement during/after therapeutic paracentesis  
(1 X 100ml bottle per 3 litres ascites removed).
2. Therapeutic albumin use for sepsis in cirrhosis, e.g. SBP.
3. Therapeutic albumin use for HRS (if **not** hypovolaemic).

ACUTE UPPER GI BLEEDING

## ACUTE UPPER GI BLEEDING

### Common emergency.

- 10% mortality in the UK.
- Presentation with haematemesis and/or melaena, and with shock or collapse.
- Syncopal symptoms such as dizziness or weakness may be present.

### Aetiology Frequency

- |                         |       |
|-------------------------|-------|
| • Peptic ulcer          | 50%   |
| • Varices               | 5-10% |
| • Oesophagitis          | 10%   |
| • Mallory-Weiss tear    | 5%    |
| • Vascular malformation | 5%    |
| • Gastritis             | 15%   |

## HOWEVER IN THIS HOSPITAL VARICEAL HAEMORRHAGE MAKES UP A MUCH LARGER PROPORTION OF UPPER GI BLEEDING

### Definitions

**Haematemesis:** vomiting of fresh or altered blood.

Minor coffee ground vomiting is rarely associated with significant UGI lesions. FOB positive vomit does not constitute haematemesis.

**Melaena:** passage of black, tarry stool. FOB positive stool is not necessarily melaena. Consider iron therapy as a cause of black stool.

**PR bleeding:** passage of fresh or cherry coloured blood PR.

This usually indicates a colonic source of bleeding, but in an unstable patient may result from a briskly bleeding peptic ulcer.

**Shock:** Pulse > 100 bpm

Systolic blood pressure < 100 mmHg

**Beware of patients on rate limiting cardiac medications and young, fit patients who may remain compensated until major blood loss has occurred.**

## Management of haematemesis and melaena

### Immediate action for all

- Oxygen
- Secure adequate IV access.
- IV fluids: 0.9% saline or colloid.
- Avoid saline in liver disease.
- Send bloods (below) including cross-match.
- 12 lead ECG in elderly/history of cardiac disease.
- Keep NBM. Consent for endoscopy will be obtained by endoscopist or other GI staff. Note any previous history of DU or GU, NSAID, anticoagulants, liver disease or dyspeptic symptoms.
- Look for evidence of chronic liver disease such as jaundice or spider naevi. If present this makes the likelihood of variceal haemorrhage greater

### Features of a major bleed

- Tachypnoea
- Tachycardia >100 bpm.
- Hypotension SBP <100mmHg supine or postural drop at any stage. Relate BP to the patient's normal e.g. hypertensive.
- Clammy, cold and peripherally shutdown.
- Conscious level reduced/confusion.
- History of syncope.

### Is the patient at Significant Risk of Death?

- Hypotensive after initial resuscitation.
- Variceal bleed likely.
- Obvious signs of chronic liver disease or deranged clotting indicative of liver disease.
- Continuing melaena, haematemesis, or rebleed.
- Existing co-morbidity e.g. IHD, renal failure, disseminated malignancy.
- Age >60 years.

### Complicating factors

- Co-morbid disease e.g. cardiovascular, respiratory, renal, malignancy.
- Rate limiting drugs prevent compensatory tachycardia e.g. s-blockers, verapamil.
- Vasodilators prevent compensatory vasoconstriction, e.g. ACE inhibitors.

### Treatment and assessment-shocked patient

- High concentration oxygen, at least 60%.
- IV access with two large bore cannulae 16G or bigger.
- Draw blood for FBC, PTR/clotting, U&E, LFTs, blood for CROSS MATCH at least 4 units of red cells. Alert BTS: consult Major Haemorrhage protocol.

- Commence IV fluids: 0.9% saline or Gelofusine 10-20 ml/kg (500- 1000ml).
- Use O negative blood if patient exsanguinating or unable to keep BP above 100mmHg systolic, and more than 1 litre of colloid given and crossmatched blood not yet available

**Monitor closely:** ideally ECG and pulse oximeter for continuous heart rate and oxygen saturation readings with frequent BP measurement e.g. every 5 mins. Consider need for HDU/ICU referral and invasive monitoring: elderly, co-morbid disease and severe bleed are indications.

- Refer to GI Registrar (bleep 2117 or through switchboard out of hours)
- ABG for oxygenation and base deficit (i.e. the severity of bleed).
- Get Hb and K+ results early.
- A urinary catheter should be inserted.
- Nasogastric intubation is not necessary.

If features of circulatory compromise persist after the initial bolus of fluid commence blood transfusion. If available use type-specific or cross-matched blood. If not, use O Negative blood. Inform Blood Transfusion that it is a significant bleed: **consider triggering Major Haemorrhage protocol.**

- Coagulopathy should be corrected using FFP and thrombocytopenia using platelets.
- Early endoscopy should be performed for all large bleeds and suspected varices but the patient must be adequately resuscitated first.

## **VARICEAL BLEEDING**

**All cases of GI bleeding in patients with known cirrhosis should be assumed to be variceal bleeding until proven otherwise**

### **What to do: -**

- 1) If significant bleed and insufficient blood is available by electronic release **ACTIVATE MAJOR HAEMORRHAGE PROTOCOL** (call switchboard 2222 – state location and adult major haemorrhage). NB in most patients the blood bank will be able to supply blood urgently without use of the MHP
- 2) Large bore IV access X2
- 3) **URGENT BLOODS**- U&Es, FBC, COAG, XM 6 units RCC
- 4) Fluid resuscitation- use O neg blood if patient exsanguinating or if systolic BP<80mmHg despite IV colloid and xs matched blood not available.
- 5) **INFORM GI REGISTRAR** (bleep 2117 or via switchboard)
- 6) Consider correct coagulopathy and particularly thrombocytopenia
- 7) Insert urinary catheter\*
- 8) IV tazocin 4.5G tds for 3-5 days reduces mortality in patients with cirrhosis, with a GI bleed irrespective of source of bleeding.
- 9) Aim for early UGIE in ITU setting but **PATIENT MUST BE ADEQUATELY RESUSCITATED FIRST**
- 10) If any significant delay in UGIE, consider IV TERLIPRESSIN 2 mgs as a bolus followed by 1mg 4-6hrly.

**Very rarely does a Sengstaken tube need to be passed pre-UGIE but if required this should be ONLY be passed by someone experienced in passing these tubes. Inadequate placement of Sengstaken tube confers no benefit but has risk of major complications e.g. oesophageal perforation**



## NON VARICEAL BLEEDING

The Rockall score is used as a means of assessing risk of rebleed and mortality following non-variceal upper GI bleeding.

Total (pre-endoscopic + endoscopic) score of 0 or 1 implies 0% mortality

- A Rockall score of 1-2 suggests a mild bleed and a score of greater than 2 a major or severe bleed. There is 50% mortality with a Rockall score of 7.

The Rockall score can be calculated preendoscopy-using the first three variables in the table and post endoscopy, using all 5 variables

Variable	Score 0	Score 1	Score 2	Score 3
<b>Age (years)</b>	<60	60-79	>80	
<b>Comorbidity</b>	Nil major		Conjesticve heart failure, ischaemic heart disease	Renal failure, liver disease, metastatic cancer
<b>Shock</b>	No shock	Pulse >100 bpm	Systolic BP <100mmHg	
<b>Source of bleeding</b>	Mallory-Weiss tear	All other diagnoses: e.g. oesophagitis, gastritis, peptic ulcer disease, varices		
<b>Stigmata of recent bleeding</b>	None		Adherent clot, spurting vessel	

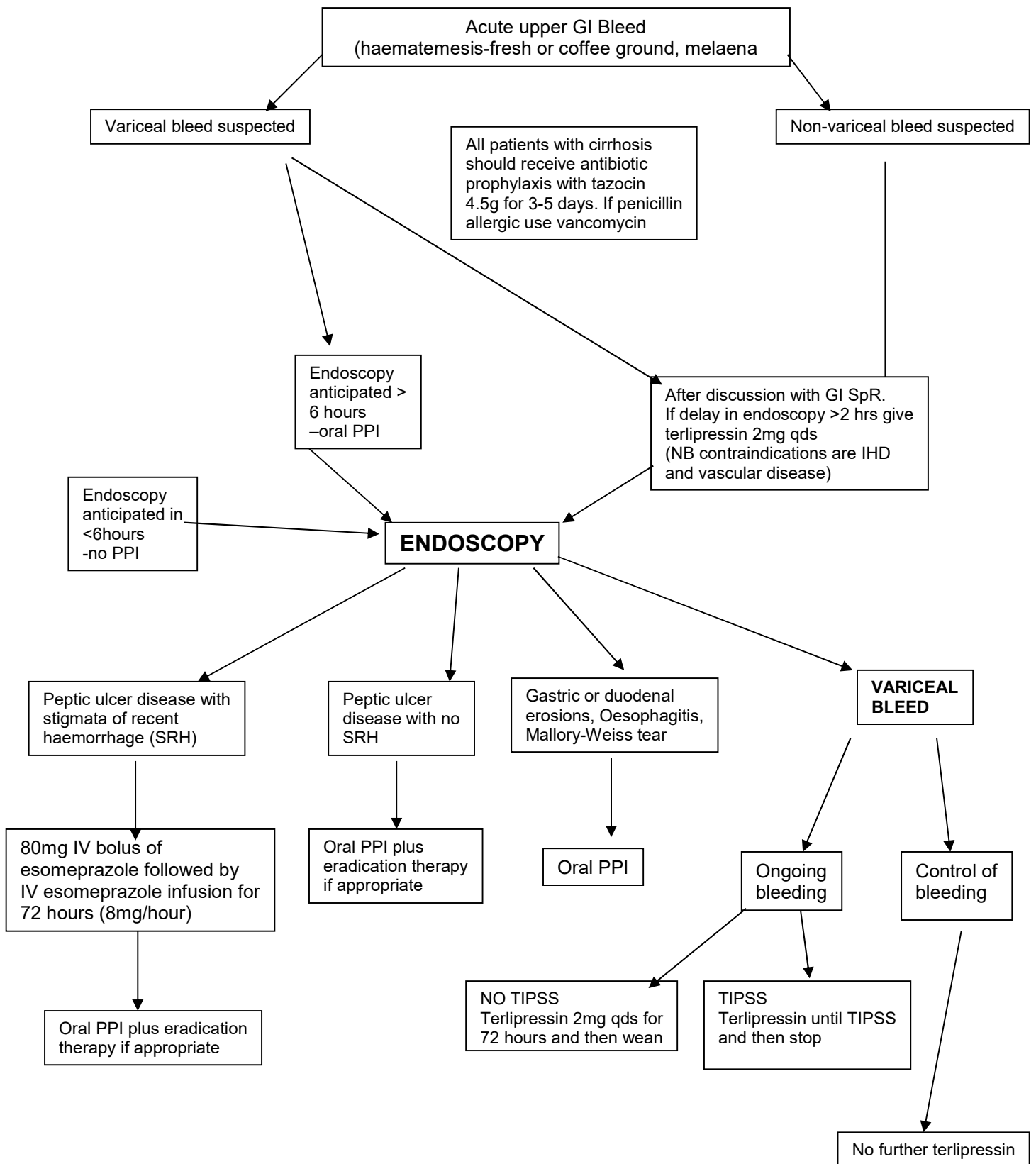
Patients in ward 205 with a significant bleed will require transfer to critical care/theatre for resuscitation and endoscopy- see protocol below for endoscopy arrangements and drugs used in GI bleeding.

## UPPER GI BLEEDING - Urgent Endoscopy and Patient Monitoring

See intranet page

<http://intranet.lothian.scot.nhs.uk/Directory/CriticalCare/GI%20liver%20and%20transplant/Upper%20GI%20Bleeding%20Urgent%20Endoscopy%20and%20Patient%20Monitoring.pdf>

## DRUGS USED IN UPPER GI BLEEDING



## **ORDERING POLICY FOR FFP AND PLATELETS, WARD 205 FOR PATIENTS WITH LIVER DISEASE:- ELECTIVE PROCEDURES/ BLEEDING**

**NB.** This protocol only applies to patients with liver disease (i.e. not those on warfarin or with cholestasis).

Most patients with liver disease that undergo elective procedures do not need correction of coagulation. There is little evidence to support the use of coagulation products for any invasive procedures; the evidence for platelet transfusion is more convincing.

We have agreed that for certain elective procedures, products will be automatically released by Blood Bank on request by medical staff of FY2 level or above, on Ward 205 and 206 Transplant and will not require you to contact the haematology/BTS registrar.

<b>Ascitic tap</b>	no products required
<b>Paracentesis</b>	no products required
<b>Arterial line insertion</b>	no products required
<b>Central line insertion</b>	products not usually required. Discuss with GI SpR
<b>Endoscopy</b>	no products required
<b>Endoscopy/banding</b>	no products required
<b>Endoscopy/biopsies</b>	products not always required. Discuss with GI SpR

### **LIVER BIOPSY/TIPSS/ERCP AND INTERVENTION**

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In the first instance you should attempt to correct the prolonged PT by use of Vitamin K 10 mg IV. Check PT 4 – 6 hrs after IV dose and if PT remains above 15 seconds then use FFP as below.

<b>ERCP and intervention</b>	4 units FFP	if PT > 15 seconds
	1 pool platelets	if platelets < 50
<b>Liver biopsy</b>	4 units FFP	if PT > 15 seconds
	1 pool platelets	if platelets < 50
<b>TIPSS (elective)</b>	4 units FFP	if PT > 15 seconds
	1 pool platelets	if platelets < 50

### **Patient with bleeding – GI or other site**

If there is concern about bleeding in patients with liver disease, prolonged PT and low platelets then 4 units of FFP and 1 pool of platelets should be ordered. If there is concern about fluid overload, ongoing bleeding or more complex coagulation deficiencies then the haematology/BTS registrar should be contacted.