Rehabilitation after Liver Transplant

CLARE WADE

SPECIALIST PHYSIOTHERAPIST – NEWCASTLE UPON TYNE HOSPITALS

Freeman Hospital

- One of seven liver transplant centres in the UK
- More than 700 liver transplants performed since first in 1993
- MDT consisting of surgeons, physicians, anaesthetists, transplant coordinators, nurses, physiotherapists, dieticians and social workers – from initial transplant assessment to long term post-transplant care
- Inpatient physiotherapists (critical care, transplant and surgery teams) involved in immediate post operative care and ward based rehab.
- Specialist medical liver failure clinics – alcohol-related liver disease, viral hepatitis and other related conditions.
- Complex liver and HPB surgical procedures.

Physiotherapy points of contact

- Pre-transplant optimisation and education
- Immediate post-transplant care in ICU – respiratory care, optimisation of ventilation, ensuring adequate secretion clearance, early rehabilitation/mobilisation
- Ward based rehabilitation – increasing cardiovascular exercise tolerance, general strengthening, functional activities, work/hobby related activities
- Ongoing rehabilitation – ongoing referral to community services, exercise groups, education

Physical complications of liver disease

- Encephalopathy
- Reduced exercise tolerance
- Fatigue
- Reduced bone mineral density
- Weight loss and malnutrition
- Reduced muscle mass and reduced strength
- Respiratory compromise

Encephalopathy

- Falls
- Balance and coordination abnormalities
- Poor cognitive function
- Muscle imbalances
- Fatigue
- Difficulty following instructions

Cardiovascular exercise tolerance

- Degree of reduced exercise tolerance correlates to disease severity
- Mainly results from cirrhotic myopathy and cirrhotic cardiomyopathy
  - Increased HR, increased CO, decreased SVR
- Also largely related to degree of malnutrition
  - Reduction in muscle mass results in atrophy of slow twitch fibres
  - Reduction in oxidative capacity
  - Increased lactic acid production at lower exercise workloads
- Impacted by impaired respiratory mechanics

Physiotherapy in pre-operative stages

- Optimisation of aerobic capacity
- Optimisation and maintenance of function and independence
  - Gait training and provision of walking aids
  - Balance and coordination
  - Core strengthening
  - Bed mobility and transfer skills
- Maximise musculoskeletal strength
- Education and exercise programmes

Barriers to progress

- Severity of illness
  - Medical stability
  - Grade of encephalopathy
  - Cognitive status
- Fatigue
- Patient compliance

Immediate post-operative physiotherapy

- ICU
  - Intubated and ventilated: V/Q optimisation – secretion clearance, lung recruitment, positioning; Limb care – positioning and passive movements to encourage maintenance of muscle length and joint mobility.
  - Extubated: positioning; active limb exercises; deep breathing exercises – thoracic expansion and relaxed abdominal breathing, supported cough/FET; liaising with medical team/specialist pain team to optimise pain relief, **early mobilisation.**
  - Prolonged wean: weaning advice and plans, early graded functional rehabilitation, lung recruitment and secretion management.
- Majority of patients extubate early, mobilise early and transfer to the ward after 48-72hrs post op.
- Stable, awake post transplant patients seen by PT associate practitioners for enhanced mobilisation – referral to PT if any respiratory/haemodynamic issues

Complications and barriers to rehab in the ICU

- Encephalopathy
- ARDS
- ICU acquired weakness
- Delirium – hyperactive and hypoactive
- Haemodynamic instability
- Bleeding and coagulopathy

Intensive Care Unit Acquired Weakness

- Risk factors
  - Severe illness
  - Prolonged sedation / mechanical ventilation- diaphragmatic atrophy
  - Sepsis / SIRS
- Proximal symmetrical muscle weakness
- Includes critical illness polyneuropathy, critical illness myopathy, or mixture of both (myopathy typically predominant)
- MRC sum score <48
- Associated with high morbidity and mortality
- Implications for reduced post-ICU quality of life and function in survivors – contributes to PICS

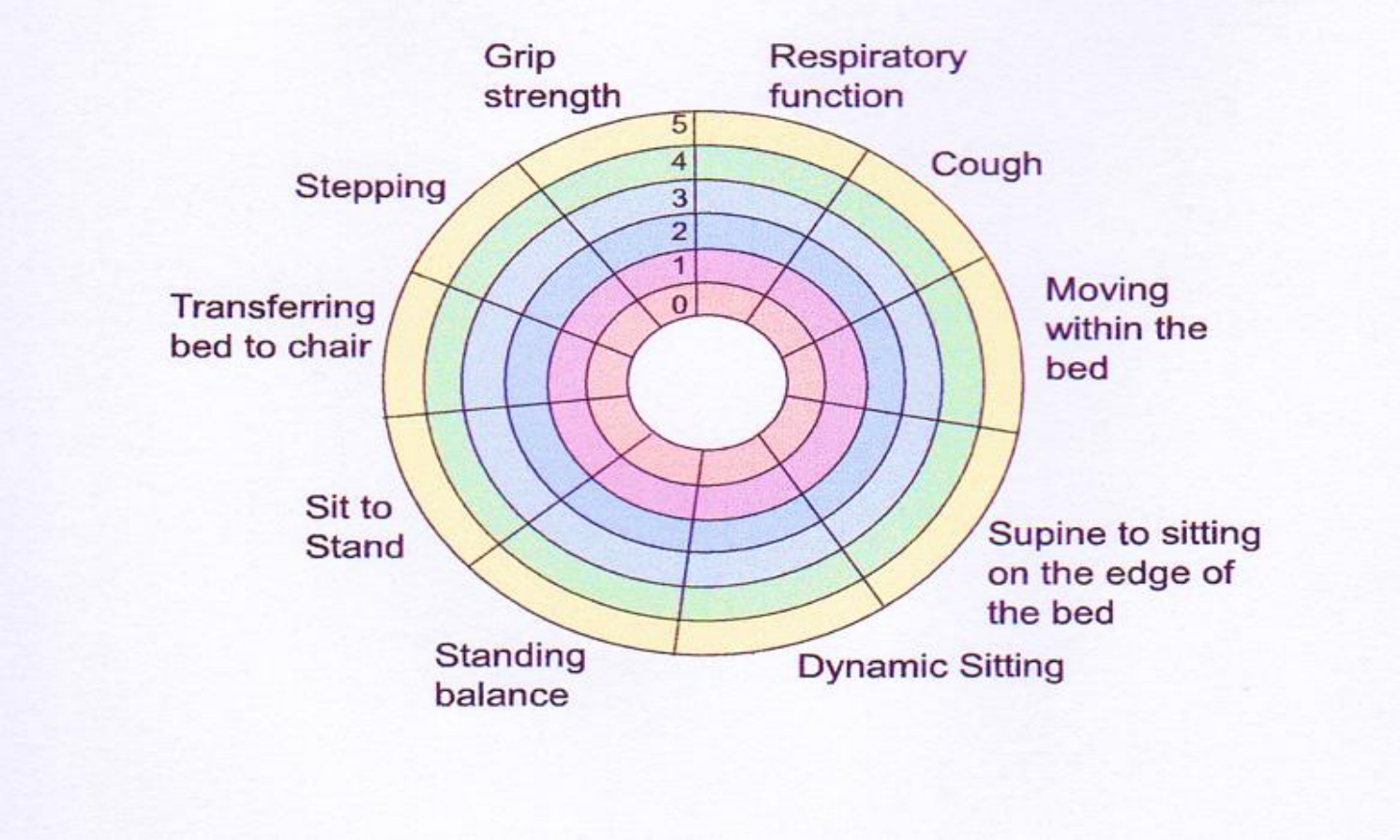
Rehab in ICU

- Reducing duration of immobilisation by reducing sedation to minimal level and early physiotherapy an important target in prevention of ICUAW (Morris 2008)
- Introduction of patient-centred early rehab for patients ventilated >5 days improves physical function at ICU discharge (McWilliams, 2014)
- Early physical rehab in intensive care can improve self-reported physical function (Kayambu, 2014)
- Early rehab safe, well tolerated and resulted in better functional outcomes at hospital discharge compared with standard care (Schweickert, 2009)(NB – standard care is minimal in US)
- Novel rehabilitation technology may enhance and facilitate early rehabilitation when patients unable to actively participate (Lee & Fan, 2012)

Graded functional retraining

- Active assisted and active limb movements
- Supported/unsupported bed edge sitting –trunk control, alignment, weight transfer, limb exercises, improving lung volume and aiding secretion mobilisation
- Supported sitting in chair
- Tilt table – weight bearing, restoration of normal postural cardiovascular responses
- Sit – stand
- Standing, balance, weight transfer
- Ambulation and gait reeducation
- Cycle ergometry
- Strengthening exercise programme
- Balance and coordination

Measuring physical outcomes in the ICU



Chelsea Critical Care Physical Assessment tool

0 = unable to perform / too unstable

1-4 = Decreasing levels of dependence / assistance

5 = Fully independent (Grip strength >80%)

Ward based rehabilitation

- Progression of exercise tolerance and cardiovascular endurance
- Mobilisation – progressing to independence with/without aids
- Cycling
- Gym / home exercise programmes
- Rehab after Critical Illness pathway for >5 days in ICU or ongoing physical/non-physical concerns as per NICE CG83
- Functional / activity based tasks
- Education and advice re: ongoing physical activity.
  - Better health related quality of life observed in post transplant patients who exercise regularly (Rongies, 2011)

Activity pacing and fatigue management

- Fatigue is a common sequela of liver disease, liver transplant and post ICU
- Important that patients are taught how to pace and optimise energy stores
- Easy to get stuck in over activity/under activity cycle (peaks and troughs)
- Overactivity leads to longer periods of rest and inactivity
- Contributes to cycle of deconditioning, thus exacerbates fatigue
- Important to break up demanding activity with periods of rest
- Slow, steady increases in activity, allowing body to adapt.

Case study

- 44 yo male
- Previous Liver transplant 30/7/15 for hepatocellular carcinoma
- Post-operative arterial thrombosis in right side liver
- Sky engineer
- University student – Media studies
- Usually F+W
- Independent and active

Events

- Re-do orthoptic liver transplant – 16/3/2016
  - 15hr operation
  - 21 litres of blood loss intraoperatively
  - 28 units PRBC, 48 pools of platelets, 4 cryoprecipitate
  - Noradrenaline intraoperatively
  - Ongoing blood loss post-operatively
- 17/3 – CT: severely compromised hepatic artery flow due to tight stricture.
- IR for hepatic artery stent – unstable BP during procedure

Events cont..

- 18/3 – Return to Th for laparotomy, control of bleeding, repacking and liver biopsy – splenic laceration and 3 other bleeding points sutured
  - 12 litres blood loss, 13 PRBC, 16 units FFP, 2 units cryo
  - Post op lactate 16 – commenced CVVH (Lactate reduced to 9)
  - Remained sedated and ventilated on BIPAP to stabilise
- 21/3 – Return to Th for biliary reconstruction, washout, removal of packs, cholecystectomy and Roux-en-Y.
  - Increased FiO2 requirements to 0.6, PEEP increased to 7

- 24/3 (POD 7) – sedation hold and weaned to ASB 5(+12). Hypertensive with reduced sedation – amlodipine. Clonidine and remifentanil to aid in reduction Propofol. Slow to wake appropriately, agitated.
- 29/3 – ASB 5(+5), profound limb weakness noted. Full body hoist to chair. CPAP trial in sitting – 1.5 hours.
- 30/3 – CPAP 5. Bed edge sit with assistance of 4, anterior/posterior and lateral weight transfer, passive limb activities – no trunk or limb activity noted. Severe ICU-AW likely.
- 31/3 (POD 14) – extubated, SV 2l O2. Bed edge sit and hoist to chair – active head control, no active movement in limbs.
- 1/4 – displaying of spontaneous UL movements – nil to command. Tightness in TAs noted – resting splints. Tilt table to 40 degrees for 5 mins – attempts to engage with functional UL activities.

- 2/4 – CAM ICU positive, hypoactive delirium. Sporadic muscle activity with active assisted limb exercises. Bed edge sit – able to maintain independently after 5 mins facilitation of trunk. Wound dehiscence – doctors not concerned, happy to continue with rehab
- 4/4 – Tilt table to 60 degrees for 10mins. Active functional reach activities in standing. Limited by delirium.
- 6/4 – Tilt table to 70 degrees for 10mins. Deep sensory input to LLs, encouraging quadriceps contraction in standing. Sat in chair – further tilt after 1 hour. Disengaged and inconsistent
- 7/4 – Tilt to 70 degrees, wheeled around unit, encouraged engagement, functional reaching and waving with ULs in standing – more alert and orientated.

- 9/4 – Standing with standing hoist and assistance of 2. Initiating and sustaining stand.

- 11/4 (POD 26) – severe PTSD identified – clinical psychology referral. D/C to ward for ongoing rehab with RaCI follow up.
- Ward rehab:
  - Arjo standing and functional tasks in standing – progressed to standing with zf.
  - Limited by LBP – pain team provided TENS and prescribed MST.
  - Increasing mobility with zimmer frame, gait reeducation to encourage reciprocal pattern.
  - Ongoing strengthening exercise programme.
  - Weekend discharge to Mum's bungalow 9/5 when mobilising independently with zimmer frame.

- RaCI outreach input – ensuring ongoing psychology input, engaging in goal setting and progression of exercise programme alongside ward team. Advice on fatigue management and pacing of activity.
- Discharge home to Mum's bungalow 11/5 (POD 56) – community physiotherapy referral made.
- Community physiotherapy –
  - mobility progression to elbow crutches, then walking sticks
  - indoor and outdoor mobility practice
  - stair practice at home, in preparation to returning to own flat
  - liaising with university re: return and support.
  - Balance and coordination.
  - Oedema management.

- Followed up in RaCI clinic
  - PTSD, nightmares (related to physio!), ongoing psychology input
  - discussion of ongoing rehab goals and progression of exercises – aim to return to swimming.
  - Liaison with community physio team
  - Visit to intensive care unit
  - Patient happy to present to healthcare professionals at patient experience study evening.

Questions?