CTICU Clinical Housekeeping

There are some clinical principles that help to improve patient outcome. This is a list of things we would like done for all applicable patients. It is not exhaustive, nor meant to be a textbook of Intensive Care Medicine, but a guide as to what is considered good practice. If you have any questions about the contents, please ask a consultant.

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Acute Lung injury score (guide to improvement/deterioration)

- Also known as the Murray Score. Please see Appendix 3.
- Should be regularly documented in all intubated, ventilated patients with "respiratory failure," (except not applicable to oscillated patients). Allows response to therapy or deterioration to be objectively assessed.

Bleeding

- TEG should be done on all post-op cardiac surgical patients
- Beware "rebound heparinisation"

Bowel care

- Prescribe appropriate aperients/softeners (usually Senna 15mg OD + sodium docusate 200mg BD, not lactulose as leads to bloating and distension)

Bronchoscopies

- The first choice scope for the unit is the Single use "Ambu" bronchoscope. These are available from the store-room. They have a dedicated screen which must be used.
- If you use a non-single use bronchoscope, please ensure you put the sterilisation tracking sticker in the patient's notes. After use, the scope needs to be cleaned and the suction port cleaned through. The scope then needs to be returned to the Endoscopy department with the patient details. This is vital for tracking the scope use. If it is not done correctly, the scope may have to be taken out of use and replaced at a cost of £10 000.

Cardiac output monitoring

- Should be used in all patients with circulatory shock refractory to fluid therapy (encompasses all patients on vasopressors or inotropes)
- Please see the Goal directed therapy protocol (Appendix 6) for uncomplicated post-operative patients **(note Safety Triggers).** There needs to be proper documentation of controlled fluid challenges (see protocol).

Death Certificates

- In the event of patient's death, a medical certificate of cause of death (MCCD) should be issued at the earliest opportunity by a CTICU trainee on duty at the time.
- Please record your GMC number on the death certificate next to your qualification, ensure your name is printed legibly next to your signature and there is a mobile number on which you can be contacted. Please don't use abbreviations (eg CABG).
- In order to complete the cremation forms, you must see the body after death.
- Some cases require referral to the coroner before the MCCD can be issued (including anyone who has had an operation or PCI during their admission).
    - The simplest way to refer to the Coroner's Office is by email. The up to date referral form and instructions are accessible from the GICU website at: http://www.gicu.sgul.ac.uk/resources-for-current-staff/legal-and-ethical/coroners%20referral%20form.docx/view
    - Please note the highlighted elements require modification (e.g. correct ICU, location, direct phone no.)

- If the death occurs outside the Coroner's office hours, this needs to be clearly handed over to a named doctor on the incoming team and this handover documented in the notes. It is very distressing to families and unacceptable practice if delays to issuing death certificate are caused by lack of attention by medical staff
- It is essential that all documentation related to patients death is completed:
    - Confirmation of patient's death in clinical notes (date and time)
    - Medical Certificate of Cause of Death, with or without discussion with the coroner
    - Cremation form
    - Discharge summary (on iClip)
    - MMC form template on L drive/files/critical care directorate/CTICU/Mortality and Morbidity/year/month
- All CTICU deaths are presented at the weekly M&M meetings. They take place each Friday afternoon. A trainee who does "the late shift" (1pm till 9pm) collects the cases during the week and presents at the M&M. The MMC form should be part of this presentation.
- The Bereavement office is on the Ground Floor, Grosvenor Wing and closes at 4.30pm. Tel 3410/3411.

FAST HUGS IN BED Please

- Mnemonic some people find useful to remember all the things that should be checked when doing your daily assessments for a patient:
- F - Fluids and Feeding
- A - Analgesia
- S - Sedation (& Spontaneous breathing trial)
- T - Thromboprophylaxis
- H - Head up position (30° if intubated)
- U - Ulcer Prophylaxis
- G - Glycaemic control
- S - Skin Care
- I - Indwelling Lines/catheters
- N - Nasogastric tube
- B - Bowel Care
- E - Environment (eg as prevention of delirium)
- D - De-escalation (remove unnecessary treatments - can I stop anything?)
- P - Psychosocial (patient, relatives, staff)

Fluids

- Fluid balance target for the day should be set on the morning ward round and written on the ICU chart (this is reviewable depending on progress during day)
- Fluid challenges to be given as per goal directed therapy protocol in appropriate post-operative patients (Appendix 6)

Glycaemic control

- Aim Blood sugar 6-10mmol/l

Infection control

- Remember Hand Washing/Gelling
- Aprons, gloves, bare below the elbow

    - The above are continually assessed by infection control and we do not always do well. Please challenge other people if you see them not complying by handing them an apron +/- gloves, especially if they are a consultant.
- Antibiotic prescribing
    - Rationale in notes and on iClip
    - Stop/Review dates (regularly audited)
- Closed suction – if intubated on the unit for anything other than an overnight stay.
- Line Care
    - Please follow the guidelines from "Matching Michigan"
    - Daily review of the need for insertion
    - Avoid femoral lines where possible
    - Aseptic insertion technique
    - Review need for lines daily
    - Swan locks
    - Careful line handling (Chlorhexidine wipes before using)

Notekeeping standards

- Please see guidelines in Appendix 1 as to what should be included.
- Write legibly and print your name at the end of each entry.
- Every side of A4 should have patient name, dob, id number, consultant in charge & unit details completed. The ward clerk can print off more patient id stickers if they have run out.
- Notes should allow the reader to follow the reasons behind decisions of the team on for that week – they should not just reproduce the observation chart.
- Prescriptions need to be reviewed each day.
- VTE assessment to be completed on iClip for each patient on admission & after 24 hours.

Nutrition

- Enteral feeding as soon as possible. Discuss TPN if enteral feeding not possible.

Other specialties

- Please accompany them when they visit the unit. CTICU is a closed unit and ICU doctors are ultimately responsible for treatment decisions.
- Only CTICU staff to prescribe for our patients

Pacing Checks

- All patients receiving temporary epicardial pacing must have twice daily pacing checks done to ensure the pacing system is reliable. See Appendix 4 for how to do this. Results must be noted to allow trends to be visualised.

Patient Diaries

- There is good evidence that a patient diary aids long term outcome in long stay patients. Please write in these diaries and encourage your consultants to do the same.

Post operative prescribing for Cardiac surgical patients:

- Please see Appendix 2 and Appendix 5

Pressure Care

- Pressure Ulcer Prophylaxis (PUP) tool is in use. Usually nurse-led

Relatives

- Please clearly document all communication with relatives in the notes (phone calls, in person, emails etc). A common complaint from relatives is that of mixed messages from different doctors. Accurate and complete documentation improves the chance of consistent information.

Renal Replacement Therapy prescription

- Prescription needs writing on a daily basis (mode and fluid exchange rate)

Sedation

- We use the Richmond Agitation Sedation Scale (RASS).
- Aim for 0 (alert but calm).
- Sedation holds daily on all CTICU patients unless specified otherwise.

Stress Ulcer prophylaxis

- Guidelines as per instructions in Postoperative prescribing section in Appendix 2. Stop when no longer necessary

Ventilation

- "Lung protective" ventilation in all patients.
- Appropriate PEEP
- Tidal volume of 6ml/kg ideal body weight unless there is a very good reason not to

Ventilator associated pneumonia (VAP) protection bundle

- (Chlorhexidine mouthwash) - not currently recommended by Trust guidelines
- 30 degrees head up
- Daily Sedation holds
- Tracheal Tube cuff pressure check
- Review need for stress ulcer prophylaxis daily (being on prophylaxis increases likelihood of VAP)
- Closed suction
- (Currently don’t have routine sub-glottic suction)

Venous Thromboembolism prophylaxis

- Please check on a daily basis that assessments and prescriptions are up to date (Trust wide scrutiny)

Appendix 1 - Note Keeping

This is a suggestion as to what should be included in the daily assessment.

- **General:**
  - Ensure patients name, dob, gender & hospital number are at the top of every sheet (sticker if available) along with the consultant's name and CTICU as the unit.
  - Date & Time
  - Day of ICU stay
  - Doctor's name & Grade
- **Background**
  - Source of admission
  - Reason for admission
  - Relevant medical history
  - Relevant surgery
  - Summary of progress since admission
  - List of active issues
- **Events in the past 24 hours**
- **Examination**
  - Temperature
  - Glucose
- **CVS**
  - Capillary Refill Time
  - Skin temp
  - Peripheral pulses
  - Heart rate & rhythm
  - Blood Pressures (including MAP, CVP & PA pressures if monitored)
  - Cardiac output, Stroke Volume & DO_2I if monitored
  - Inotropic/vasopressor support
  - Lactate
  - Heart sounds
  - Oedema
  - TEDS
- **Respiratory**
  - Airway (patient's own, ETT, Tracheostomy & how old?)
  - Level of support (oxygen mask (Type?), optiflow, NIV, IPPV)
  - Respiratory Rate
  - F_iO_2 & S_pO_2
  - Ventilation
  - Mode
  - F_iO_2
  - Inspiratory pressure, pressure support level, PEEP
  - Set rate
  - Spontaneous rate
  - TV (mandatory and assisted)
  - If on volume controlled mode; set TV, supported TV and peak airway pressure
  - ABGs
  - Murray score if ARDS/ALI
  - CXR findings

- **GI**
  - Inspection, palpation & auscultation
  - NG in situ & positioned correctly
  - Feeding
  - type of feed
  - Absorbing ? aspirates <200
  - Prokinetics?
  - Last Bowel motion
  - Laxatives?
- **Renal**
  - Balance since midnight / in the past 24 hours
  - Urine output for the last 3 hours
  - Diuretics?
  - RRT:
    - State mode, dose, anti-coagulation, fluid removal rate
  - Biochemistry results
- **Neuro**
  - Sedation hold?
  - Sedatives used
  - RASS
  - Pupils
  - GCS
  - Focal neurology; moving 4 limbs?
- **Micro**
  - +ve cultures
  - Antibiotics and duration of Rx
  - WBC & CRP plus trend
- **Haematology**
- **Lines/Catheters/Drains**
  - Where and how old
- **Review medication and note any changes**
- **Plan**
  - Must include rationale for decisions
- **Please document all telephone conversations with consultants regarding patient care in the patient's notes.**
- **All conversations with the patient or relatives must also be accurately documented.**

Appendix 2 - Post operative prescribing for Cardiac surgical patients:

- If you are unsure about any prescribing, please check with the consultant.
- Please check for relative or absolute contraindications. This list is not supposed to stop you thinking about whether what you are prescribing is sensible for that particular patient.
- **Analgesia**
  - Regular Paracetamol 1g po QDS **plus** PRN Paracetamol 1g iv QDS (the nursing staff will choose most suitable route)
  - Regular Dihydrocodeine 30mg QDS unless over 80 years old or frail and concerns re opiate overdose
  - Morphine or Alfentanil infusion
  - Morphine Liquid 10mg po PRN when infusion stopped
- **Antihypertensives**
  - Patient's regular medications (eg ACE inhibitors, Angiotensin blockers, Calcium channel blockers) are usually best suspended on iClip for the perioperative period
- **Antibiotic prophylaxis:**
  - CABG only: Cefuroxime 750mg IV **two** post op doses
  - Any other Cardiac Surgery: Cefuroxime 750mg IV **four** post op doses
  - Allergy to Cefuroxime: see protocol in Appendix 5
- **Aspirin**
  - 300mg PR or PO loading dose 6 hours after any CABG surgery unless directed otherwise by surgeon/anaesthetist (eg if platelet function known to be inhibited already)
  - Aspirin 75mg OD (for any surgery involving CABG)
- **Beta blocker**
  - D1 post op unless contraindicated - prophylactic against perioperative AF
  - usually Bisoprolol 1.25mg OD
- **Bowel care**
  - Senna 15mg OD
  - Sodium Docusate 200mg BD
- **Clopidogrel**
  - Only if specifically indicated (eg on this instead of aspirin pre-op or requires DAPT because of coronary stents etc). 75mg OD.
- **Electrolyte replacement**
  - Potassium Chloride
  - Addiphos
  - Magnesium Sulphate
- **Fluid therapy**
  - Hartmanns 50-100ml/hr depending on needs
  - Hartmanns 250ml boluses for hypotension up to max 1500ml before medical review
  - Consider Volplex 250ml boluses for hypotension up to max 500ml before medical review
  - Surgeons will often prescribe co-amilofruse for post op patients. This can complicate fluid balance on day 1 post op so is usually best left until day 2 post op.

- **Glycaemic Control**
  - Actrapid infusion
  - 20% or 50% Glucose infusion
- **Inotropes and Vasoactive drugs**
  - Prescribe whatever infusions they come from theatre on, eg:
  - Adrenaline
  - Dopamine
  - Glyceryl Trinitrate
  - Milrinone
  - Noradrenaline
  - Vasopressin
- **Sedation**
  - Propofol infusion
- **Statin**
  - usually Atorvastatin 40mg OD unless already established on another
- **Stress ulcer prophylaxis**
  - Ranitidine 50mg TDS iv until taking oral or ng medications
  - Ranitidine 150mg BD po when absorbing. Stop when on normal diet
  - Omeprazole 20mg OD if PPI needed on an ongoing basis **except**
  - Lansoprazole 15mg OD if on Clopidogrel (PPIs decrease the efficacy of clopidogrel by inhibiting activity of the CYP2C19 complex which is necessary to convert clopidogrel to its active form. Lansoprazole may cause less inhibition than omeprazole)
- **VTE assessment & prophylaxis**
  - Complete VTE assessment on iClip unless already done
  - Usually Dalteparin 5000 units OD
  - Heparin 5000 units BD if GFR <30
  - Dalteparin 5000 units BD if in Atrial Fibrillation or have mechanical heart valve

Appendix 3 - Murray Score

Introduction

The Murray Score is an indicator of the severity of lung injury in ventilated patients. The Murray score should be performed for all patients who are suspected of having 'respiratory failure' i.e. not simple post-ops. Calculation of the Murray Score is based on the table below:

Score	0	1	2	3	4
PaO_2/F_IO_2	≥ 40	30-39.9	23.3-29.9	13.3-23.2	<13.3
Alveolar consolidation	None	1 quadrant	2 quadrants	3 quadrant	4 quadrants
PEEP	≤5	6-8	9-11	12-14	≥15
Compliance ($ml.cmH_2O^{-1}$)	≥80	60-79	40-59	20-39	≤19

The Murray score should be calculated at least daily, ideally at key points (e.g. before starting steroids/changing ventilator settings etc.).

It is calculated as follows:

1. Put the patient on 100% oxygen (if not already);
2. After 20 minutes do a gas;
3. Measure the P_aO_2 - this is your PF ratio;
4. Document the number of quadrants 'infiltrated' on the latest chest x-ray-this will be a number between 0 and 4;
5. Identify the PEEP value;
6. Calculate compliance: TV/(PAP-PEEP) – or look on the ventilator;
7. Refer to the table for the 'final score';
8. Document on the ITU chart.

If you patient is on High Frequency Oscillatory Ventilation (HFOV), you cannot calculate the Murray Score (because you can't measure compliance). In this case simply document and calculate the PF ratio at the same frequency as you would the Murray Score.

Appendix 4 - Temporary Epicardial Pacing Checks

1: CHECK INTRINSIC RATE:

Turn down the pacing rate (Rate ppm dial) until the patient's own rhythm takes over (ie pacing rate lower than intrinsic heart rate). Note intrinsic rate and rhythm.

If patient has no underlying intrinsic rhythm or intrinsic heart rate <40bpm, DO NOT continue and seek senior help.

Increase pacing rate again (turn up Rate ppm dial) until paced rhythm is present.

Turn both Atrium Ampl. dial (=Atrial output) & Ventricle Ampl. dial (=Ventricular output) to 0.1 to prevent pacing.

2: CHECK V SENSING = Check V Sensitivity threshold.

The green light on the box flashes when a beat is sensed. Slowly turn the Ventricle Sens. dial to increase V sensitivity until no sensing is detected (ie green light doesn't show in response to a QRS).

Note down the value from the dial (in mV) at which the box stops sensing the QRS complex (ie pacemaker thinks there is no QRS complex) . This is the **V sensitivity threshold**.

Turn dial back to half of V sensitivity threshold & leave set at this as safety precaution to ensure accurate sensing.

3: CHECK V PACING = Check V Capture threshold.

Set pacing rate to 20% higher than the intrinsic Heart Rate (using Rate ppm dial).

Turn the Ventricle Ampl. dial to maximum.

Slowly turn down the Ventricle Ampl. dial until a QRS complex no longer follows each pacing spike on the ECG monitor (ie the heart is not capturing).

Note the value from the dial (in Volts) at which capture is lost. This is the **V capture threshold.**

Turn the dial up to twice the V capture threshold & leave set at this as safety precaution to ensure reliable capture.

TO CHECK THE ATRIAL SETTINGS

These steps are not necessary if intrinsic rhythm is Atrial Fibrillation. In this case, turn Atrium Ampl dial to 0.1 & leave it there.

Set the Ventricle Ampl. dial to 0.1 whilst testing the Atrium (reminder - only do this if intrinsic rate >40).

4: CHECK A SENSING = Check A Sensitivity threshold

Repeat step 2 but using Atrium Sens. dial (& for "QRS Complex" read "P wave"). Note the A sensitivity threshold.

5: CHECK A PACING = Check A Capture threshold

Repeat step 3 but using Atrium Ampl. dial (for "QRS Complex" read "P wave"). Note down the A capture threshold.

RESET THE Ventricle Ampl. DIAL TO ITS SAFE VALUE (from step 3).

EMERGENCIES

Severe bradycardia, PEA or asystole cardiac arrest and AV wires in place

↓

Check wires connected and pacing is on

↓

Start pacing DDD mode 90 bpm

↓

Increase output of both A and V to maximum

If patient is paced and in cardiac arrest

↓

Switch off pacing to exclude underlying shockable rhythm (VF/VT)

TERMINOLOGY

*Code: First letter is chamber **paced**, second letter is chamber **sensed** (A=atrium, V= ventricle, D=Dual, O=none). Third letter is response to sensing (O=None, T=Triggered, I=inhibited, D=T+I).

*Ampl. = Amplitude. Sens. = Sensitivity.

*Sensitivity is the minimum current that the pacemaker is able to sense (a lower number corresponds to a greater sensitivity).

*Capture is when the pacemaker generator sends out an electric current that successfully stimulates the heart to beat. It looks like spikes before P and widening QRS complex.

The capture threshold is the minimum pacemaker output required to stimulate an action potential in the myocardium.

USUAL INITIAL VALUES

AV delay 180-250 msecs

A sensitivity threshold: 0.5-3 mV	A capture threshold: 1-5 V
V sensitivity threshold: 1-5 mV	V capture threshold: 1-7V

Appendix 5: Cardiac Surgical Prophylactic Antiobiotic Protocol

Surgical intervention	Prophylaxis		
	"Routine"	Penicillin anaphylaxis or cephalosporin allergy	Patients known to be MRSA colonised
CABG	iv Cefuroxime 1.5g at induction and every 4 hours intraoperatively. Postoperatively 2 further doses of 750 mg at 8 & 16 hours	iv vancomycin 15mg /kg infusion 60 min prior to incision followed by 1g 12 hours later * + iv ciprofloxacin 400 mg at induction and every 8 hours	iv vancomycin 15mg /kg infusion 60 min prior to incision followed by 1g 12 hours later * + iv cefuroxime 1.5g at induction then 2 further doses of 750mg at 8 &16 hours
Valve replacement	iv Cefuroxime 1.5g at induction intraoperatively as above Postoperatively 4 further doses of 750 mg at 8 hourly intervals	iv vancomycin 15mg /kg infusion 60 min prior to incision than 2 further doses of 1g at 12hhrly intervals* + iv ciprofloxacin 400 mg at induction and every 8 hours	iv vancomycin 15mg /kg infusion 60 min prior to incision further doses of 1g at 12 hourly intervals * + iv cefuroxime 1.5g at induction then 4 further doses of 750mg at 8 hourly intervals

- Repeat doses of antibiotics should be given in prolonged surgery at the following intervals is renal function is normal:
  - Cefuroxime : 750mg 4 hourly see the table above
  - Ciprofloxacin: 400mg 8 hourly see table
  - Vancomycin: 1g 12 hourly
- **Repeated doses may also be required following fluid resuscitation after severe blood loss.**
- **Post operative Vancomycin dosing should be adjusted or omitted in patients with renal impairment.**

Appendix 6 - Goal Directed Fluid Therapy in CTICU

TO BE USED ON POST OP CABG OR AVR PROCEDURES unless specified otherwise
Contraindications for PulseCO include severe aortic regurgitation and IABP