Post-op and fluids

Early post-op review

Early review:

- Patients often remain in Theatre Recovery for up to 2h after operation is completed. During this period a member of the transplant team must review them there.
- Surgical registrar contacts renal team once patient in recovery to communicate intraoperative course / concerns, and facilitate nephrology review.
- Post op review by surgical team (either in recovery or HDU) to consider fluid status, wound and drain output.
- Fluid management: see below for details.
- Failure of the patient to respond to IV Fluid with a rise in CVP or BP should raise possibility of bleeding. If there is a possibility of bleeding a transplant surgeon must be contacted.

If expected immediate graft function and urine output <40mls/hr

- Ensure catheter not blocked. Member of surgical team should flush out catheter at this early stage.
- If requested by surgeons arrange Doppler ultrasound.
- Ensure CVP target is appropriate, and reached (see fluid management, below).
- Consider IV NaCl at continuous rate of 100 mls/hr initially.
- Response must be carefully assessed (hourly initially) before continuing infusion at this rate and especially if remains oligoanuric.

Any concerns should be discussed with transplant surgeon and renal team.

If expected Delayed Graft Function (DGF)

- Careful monitoring of fluid status is required as higher risk of precipitating pulmonary oedema.

Monitoring

- Check FBC and U&E immediately post-op.
- Serum K+ must be known and result discussed with Registrar.
- Hyperkalaemia should be managed with Insulin/Dextrose and nebulised Salbutamol rather than haemodialysis when possible.
- Subsequently repeat U&E 12 hourly for the first 48h (more frequently if indicated or as decided).

Other aspects of early post-op management

- Arrange chest X-ray for position of central line (may be performed in recovery â€“ ensure checked).
- Analgesia is by PCA morphine/Fentanyl. Inadequate pain relief may herald serious pathology and should be discussed with a senior surgical colleague/Anaesthetist. NSAIDs are absolutely avoided.

Fluid management

Failure of the patient to respond to IV Fluid with a rise in CVP or BP should raise possibility of bleeding. If there is a possibility of bleeding a transplant surgeon must be contacted.

Fluid management: first 2 hours

- Immediately post-op IV fluid replacement is Normal Saline/ Plasmalyte at 60 mls/hr + last hourâ€™s urine output. This should be guided by the CVP.
- Usually aim for CVP 6-10. If >10, reduce infusion rate. If <6, give 250ml of Plasmalyte (or N saline) bolus and review. Repeat a max of once more before seeking surgical or senior advice.
- Fluid regimen should take into consideration: amount of fluid given in theatre, total blood loss, native urine output, cardiac status, patient age (extra caution if >65), any additional losses, and whether delayed graft function (DGF) is to be expected.
- If there are additional losses (e.g. drains after pancreas transplantion), count total loss, not just urine, in replacement sums.
- If patient is polyuric, shorten the period of replacement with high-salt solutions (see Polyuria, below).

Fluid management: 2-12h

- Start with *alternating bags of 5% dextrose and Normal Saline* (or Plasmalyte) at a rate = urine output +60.
- As soon as patient is drinking, reduce infusion rate to compensate.
- See also the CVP guidance above.
- Polyuria: If patient is producing more than 200 ml/h, the amount of salt in the regimen should be reduced to prevent salt overloading – see Polyuria.
- If any signs of hypovolaemia (falling BP, CVP or JVP, tachycardia, Â± reduced urine output) give boluses of N Saline or Plasmalyte; check Hb. If no response or repeatedly needed, inform surgical team and seniors.

Fluid management from 12h

- Discontinue IV fluids as soon as patient is able to drink enough. This is often possible on the second post-op day.
- If polyuric, reduce the salt content in replacement regime – see Polyuria

Subsequent fluid management

- If patient unable to keep up with urine output, check desired balance from ward round/ notes.
- After the first 24h, infusion rates based on matching hourly urine output are not usually appropriate.
- If >4-5L output in 24h, see polyuria.
- If needed, suitable supplementary fluid may often be 4% glucose/ 0.18% NaCl at a rate to compensated for the predicted shortfall. This is equivalent to 4 bags glucose to 1 NaCl. It can also be given as separate bags of glucose and Saline/ Plasmalyte.
- Occasional patients lose more salt. This usually becomes apparent after a few days. Increasing dietary salt minimises the need for IV replacement. Hyponatraemia usually indicates water overload rather than salt deficiency, but this must be ascertained clinically.

Fluid replacement in POLYURIA

Urine is not a high-salt fluid

PLASMALYTE/SALINE ARE NOT SUITABLE REPLACEMENT FLUIDS FOR URINE

- Each litre of Normal Saline or Plasmalyte contains 9g of salt, equivalent to 1.5 days of maximum healthy salt intake.
- Salt overloading causes pulmonary oedema, hypertension, peripheral oedema – and worsened polyuria. It increases the risk of complications and is likely to prolong hospital stay.
- Pay careful attention to the ratio of salt to water in replacement fluids.
- Reduce ratio of NaCl to Glucose bags quickly from 1:1 to 1:2, and later to 1:3 or lower.
- For a patient who is eating but falling short of fluid intake by a couple of litres, and who is not salt deficient, use 5% Glucose or 4% Glucose/ 0.18% NaCl.