

1. PLANS

Fluid balance = burns systemic response → leaky capillaries → hypovolaemia

→ could also be due to low bp. → systemic vasodilatation

Response - main barrier to prevent infection = skin - damaged

- Pseudomonas aeruginosa, Staph aureus.

→ sephalosporins + amoxicillin

↳ broad spectrum antibiotics → narrow after sample taken

→ clammid ā → formation of MRSA → vancomycin

Severe burns - hyper metabolic state - stress response - ↑ breakdown of protein, TNF + IL-6 modulate response

Diff in burn response

1.a) The mother is severely severely burned as she has seventy percent total body burns. She is in a critical situation as her body undergoes a response to trauma.

The burns will induce a systemic vasodilatory response.

This means that the capillaries will become leaky and intravascular contents will leak into the interstitial spaces.

The leaking of intravascular fluids into the interstitial spaces will mean that intravascular volume is reduced

✓ (hypovolaemia) resulting in hypotension and cardiogenic shock. The hypotension is caused both by the reduced volume

✓ intravascular fluid volume and the dilation of the vessels.

The extravasation of blood will mean that organ

✓ perfusion will be impaired especially if the fluid balance problems are not corrected before cardiac shock sets in. This

✓ hypoperfusion of organs will mean that ~~less~~ ~~inadequate~~ organs

✓ will receive an inadequate supply of both oxygen and nutrients,

✓ leading to ischaemia and then necrosis. If this is not corrected

✓ in time it could lead to multi-organ failure. If the kidney

✓ is affected by this hypoperfusion, it could will lead to further

✓ exacerbation of the fluid balance problems as the kidney

✓ is the main organ regulating fluid balance, both in terms

✓ of the vasopressin response which has a prime role in the

Not really but burning loss of skin

could have given more physiology

control of serum osmolarity and the renin-angiotensin system which controls volume levels.

To correct these fluid balance problems, ~~colloids~~ should be ~~given intravenously~~. ~~(e.g. gelatins)~~. ~~These fluids~~ will act to increase the ~~osmotic~~ oncotic pressure inside the vessels, thereby drawing fluid

To correct these fluid balance problems, fluids with a high oncotic pressure, such as gelatins (colloids) should be used. These will act to increase intravascular oncotic pressure thereby drawing ~~out~~ the fluid that has seeped into the interstitial spaces back into the blood vessels. This will also act to support the blood pressure. There is controversy over whether colloids should be used in the treatment of burns as they are expensive and in major burns end up leaving the vessels eventually. It is however, the preferred fluid to be given to burns patients. She should also be given normal 0.9% saline, to ~~maintain~~ help maintain electrolyte balance. The ventilation she is receiving will help to increase blood oxygen levels, helping to combat the potential ~~hypoperfusion~~ ischaemia from hypoperfusion of ~~organs~~ organs.

best fluid replacement of the day!

b) The mother is at high risk of infection because she has 70% burns, meaning she has damaged a huge part of the body's natural barrier to infection, the skin. Furthermore she is in a hypermetabolic state (resting metabolic rate can increase by up to 200% in major burns patients) and this will lead to ~~her being~~ immunosuppression further increasing her risk of infection as another ~~reaction~~ host response to infection will be underperforming. This means that there will be reduced neutrophil and macrophage activation in response to infection and reduced production of their mediators (which activate the adaptive immune response) which will

allow infectious organisms to persist for longer.

Statistics show that the likely organisms to cause infection in a burns patient are *Pseudomonas aeruginosa* (from the skin) and *Staphylococcus aureus*. The patient is however open to other nosocomial infections as the main barrier to infection, the skin is damaged. If infection does occur, broad spectrum antibiotics should be given initially, whilst a smear is sent to the labs for analysis, the results of which will help to identify a narrow spectrum antibiotic suitable for use. Amoxicillin (a broad spectrum) antibiotic could be used initially and a more narrow spectrum antibiotic (e.g. penicillin) ^{if staph aureus} used once the organism is identified.

Overall
unbalanced
section c)

A burns patient enters a hypermetabolic state in which their resting metabolic rate can be as high as 200% more than normal. This hypermetabolic state means that there is increased protein breakdown being to produce amino acids which are shuttled into gluconeogenesis in the liver in an attempt to meet metabolic energy demands. There is increased fatty acid metabolism and in turn there can also be insulin resistance due to IL-6 and TNF- α . This means that the body will rely heavily on protein and fat as ~~an~~ an energy substrate rather than glucose. Being a patient with 70% burns, the mother will no doubt have trouble feeding herself, and so an alternative form of feeding must be implemented. This ~~is~~ will most likely be a NG tube or a PEG tube. It is ~~extremely~~ essential that the mother be well-nourished in this catabolic state in order to aid recovery and avoid malnutrition, which inadvertently will ~~cause~~ increase her immunosuppression and slow her recovery. The help of a dietician must be sought who will calculate her metabolic energy requirements and administer

these. The mother will need a high calorie diet, which is high in proteins and fat to replace those being expended ~~by gluconeogenesis~~ by gluconeogenesis. She may also need metformin to decrease insulin resistance.

✓
insulin!
metformin ↓

To conclude, the mother is a major trauma patient who is in danger of multi-organ failure and shock. She is also immunosuppressed and so activation of the innate immune response (complement, defensins) will be reduced; ~~macrophage~~ neutrophil and macrophage activity being especially reduced and ~~this~~ this coupled with the loss of the body's most important physical barrier to infection (the skin) puts her at a high risk of infection. Her burns mean that she will enter a hypermetabolic state with extensive protein catabolism. She must thus be nourished to meet the heightened energy demands, and her critical condition ~~means~~ means that she will most likely have to be ~~fed~~ fed through a PEG or NG tube, to avoid malnutrition and aid recovery.

Fabulous essay. Outstanding.
An absolute pleasure to read -
coherent, patient centred + integrated!