APPENDIX D

PROTOCOL FOR THE MANAGEMENT OF DKA

ENDOCRINE EMERGENCIES

1. HYPERGLYCAEMIC COMA

Clinical and Laboratory Features

	Hyperglycaemic keto-acidotic coma	**Hyperosmolar non-ketotic coma**
History	Previous history of DM, Poor compliance with Rx, infection	50% will have no history of DM. Infection, trauma, drug-induced
Age	Younger	Elderly
Onset	Hours to days	Several days
Symptoms	Polyuria, polydipsia, anorexia, nausea, abdominal pain, vomiting, stupor	Severe polyuria, polydipsia, increasing somnolence
Signs	Moderate dehydration, acidotic breathing, confusion - coma	Profound dehydration, stuporosed-comatosed, focal neurological signs
Blood glucose	elevated (up to +- 40 mmol/l)	markedly elevated (>40 mmol/l)
Blood and urine ketones	strongly positive	usually absent-weakly positive
Serum sodium	usually decreased	normal/increased/decreased
Serum potassium	normal/increased/decreased	normal/increased/decreased
Serum bicarbonate	very low	normal/slightly decreased
Anion gap	increased	normal/slightly increased
Blood pH	markedly decreased	normal/slightly decreased
Serum urea	slightly elevated	markedly elevated
Serum Osmolality	<330 mosmol/kg	>350 mosmol/kg

Serum osmolality = 2 ($Na^+ + K^+$) + urea + glucose

Therapy

(i) **Fluids**

(a) 1litre normal saline or preferably Ringers Lactate or Balsol (especially if the C1 level is high in significantly acidotic patients) + 100 mg Thiamine IV over the first half hour.

(b) Over the next hour continue with 1litre normal saline or Ringers Lactate for ketoacidotic coma, but with half normal saline for hyperosmolar coma. Should be continued 1 to 2 hourly depending on the clinical response.

(c) If the serum sodium rises to 150 mmol/l or more, or if the plasma glucose falls below 15 mmol/l, then 5% dextrose water should be used.

(ii) **Insulin**

(a) Delay insulin until serum K+ is known to be >3,5 mmol/l.

(b) 10 u regular insulin IV stat, then 10 u IV hourly.

(c) Insulin may be given as IV boluses or as a constant IV infusion.

d) The dose of insulin should be doubled if the glucose decrement is poor, i.e. less than 4 mmol/hour.

(e) Intravenous insulin must be continued until ketoacidosis and glucose are controlled, i.e. base excess near normal and blood glucose <15 mmol/l respectively.

(iii) **Potassium**

(a) Withhold potassium supplementation initially if the ECG and/or serum measurement suggests hyperkalaemia.

(b) Otherwise replace potassium according to potassium measurements done hourly.

K+ < 3 mmol/l - 40 mmol KC1 per litre fluid

K+ 3 - 4 mmol/l - 30 mmol KC1 per litre fluid

K+ 4,1- 5 mmol/l - 20 mmol KC1 per litre fluid

K+ 5,1- 6 mmol/l - 10 mmol KC1 per litre fluid

K+ > 6 mmol/l - Omit KC1

NB: Never give >20 mmol KC1 per hour IV.

Replace phosphate as KPO4 when supplementing K+ initially. May need to replace Mg as well.

(iv) **Acidosis**

(a) If the pH is less than 7,0, 50 mL of 8,5% Sodium bicarbonate is given IV, provided K+ > 4,0mmol/l.

(b) When the blood glucose is controlled (i.e. less than 15 mmol/l) but acidosis is still present (i.e. Base Excess NOT normal), 5% Dextrose water plus KC1 together with hourly insulin injections must continue until the BE normalises.

(v) **Supportive Treatment**

(a) Antibiotics where indicated

(b) Full heparinization with hyperosmolar comas

(c) Cardiorespiratory support as indicated

(d) Nasogastric suction if gastric dilatation present

(Where there is uncertainty in a comatosed patient, i.e. hyperglycaemic vs hypoglycaemic coma, treatment should be as for hypoglycaemic coma - see below)