GUIDELINES FOR PERIOPERATIVE STEROIDS

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Introduction

It has been about 50 years since the first case reports of perioperative shock due to secondary corticosteroid insufficiency. Since then it has been recommended that patients have adequate steroid replacement therapy to avoid perioperative haemodynamic instability. However there is a continuing debate over the amount of steroid that should be given. Some feel that only physiological amounts of steroids are necessary while others give much larger doses.

Physiology of cortisol secretion

Long term steroid therapy for chronic diseases like asthma suppresses the hypothalamic-pituitary-adrenal (HPA) axis. Studies have shown that in normal patients with major stresses like trauma or surgery the HPA axis is activated, leading to a surge in systemic cortisol. This surge continues for up to 72 hours after the insult and is thought to be protective as cortisol has a number of anti-inflammatory effects and prevents hypotension and shock. Loss of this surge may precipitate intraoperative or postoperative haemodynamic instability.

It is estimated that adults secrete 75-150mg of cortisol in response to major surgery and 50mg a day for minor surgery, and secretion parallels duration and extent of surgery[1].

Side effects of excessive steroids

The documented adverse effects of excessive corticosteroid supplementation include hyperglycaemia, immunosuppression, protein catabolism, impaired wound healing, hypertension, fluid overload, psychosis and aseptic necrosis of the femoral head. Hence it is not advisable to prescribe supraphysiological amounts of steroids when current evidence shows that physiological amounts are sufficient.

Who needs additional steroids

Studies over the last 20 years have shown that many patients on long term glucocorticoid therapy have undergone uneventful major surgery with only their usual steroid doses.

In a review of perioperative haemodynamic instability less than 1% of the cases could be attributed to glucocorticoid insufficiency. However, the problem is real and does occur[2]. The risk of anaesthetising and operating on such patients depends on the duration and severity of the operation and dose of steroids taken.

The gold standard for assessment of HPA function is the insulin tolerance test but the short synacthen test is cheaper and less unpleasant.

In experimental studies evaluating the HPA axis almost all patients taking less than 10mg prednisolone have been shown to have a clinically normal response to HPA testing[1]. These patients do not need additional steroid cover other than their usual steroid dose. This should be taken preoperatively and continued as soon as oral intake is possible.

It is recommended that patients on long term steroids equivalent to more than 10mg prednisolone daily (or who have received

Table 1: Suggested steroid treatment regimen[1]

PATIENTS WHOSE HAVE RECEIVED A REGULAR DAILY DOSE OF MORE THAN 10MG PREDNISOLONE OR EQUIVALENT IN THE LAST THREE MONTHS	
Minor Surgery (*hernias, hands*)	25mg Hydrocortisone at induction
Moderate Surgery (*hysterectomy*)	Usual pre-op steroids + 25mg Hydrocortisone at induction +100mg hydrocortisone/day
Major Surgery (*major trauma, prolonged surgery, or surgery where there is delayed oral intake*)	Usual pre-op steroids + 25mg Hydrocortisone at induction +100mg hydrocortisone/day for 2-3 days Resume normal oral therapy when gastrointestinal function has returned
ALL OTHER PATIENTS - no additional steroids required.	

Table 2: Equivalent drug doses (British National Formulary, March 2003)	
Prednisolone 10 mg is equivalent to	Betamethasone 1.5 mg
	Cortisone acetate 50 mg
	Dexamethasone 1.5 mg
	Hydrocortisone 40 mg
	Deflazacort 12mg
	Methylprednisolone 8 mg

such a dose within the last 3 months) receive a physiological replacement regimen. Alternatively adrenal suppression should be excluded by preoperative biochemical testing. However, in many hospitals, it may not be practical to conduct such assessments. In such situations, steroid cover will be appropriate according to the regimen in Table 1.

The regimen of replacement is based on the physiological requirements of stressed controls in human studies. In patients with proven adrenalcortical insufficiency a low dose physiological substitution regimen results in circulating cortisol values greater than in normal patients and is sufficient to prevent intra-operative haemodynamic instability[3].

An infusion is preferable as it avoids large increases caused by bolus injection[1]. However infusion may present practical difficulties. Some studies have shown that one quarter the daily dose administered six hourly may be adequate.

References:

1. Nicholson G, Burrin JM, Hall GM. Peri-operative steroid supplementation. Anaesthesia 1998; **53**:1091-104.

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3. Symreng T, Karlberg BE, Kagedal B, Schildt B. Physiological cortisol substitution of long-term steroid-treated patients undergoing major surgery. British Journal of Anaesthesia 1981; **53**: 949-54.