

# The case for Perioperative steroid supplementation

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The issue of providing steroid supplementation, during the peri-operative period, for patients receiving steroid therapy has long been a hotly debated issue. In the *Lancet* of 1996, Levy<sup>1</sup> wrote that, "The need for patients on long term steroid treatment to increase their dose of glucocorticoids when under stress is a principle that rests in one of the most tranquil corners of medical dogma". Reviewing the literature it appears that most of the debate has arisen from the publication of two case reports in the 1950's<sup>2,3</sup>.

It has been said<sup>4</sup>, that our fear of precipitating an adrenal crisis is largely associated with medical diagnostic failure not adrenal failure. In other words adrenal failure is a rare event. Nevertheless it has become accepted practice to supplement patients with large doses of steroids in order to avoid this apparently horrendous complication.

Research has shown that adrenal function returns to normal within a relatively short period<sup>5</sup> after cessation of steroid therapy, and that routine supplementation is not necessary. Stress induced adrenal failure is rare, and when confronted with intra-operative hypotension, the anaesthesiologist must actively search for other causes<sup>6</sup>. On the whole, patients receiving exogenous steroids have preserved adrenal function and their response to surgery is similar to that of normal patients. In those with proven or suspected adrenal insufficiency, low dose physiologic substitution<sup>7</sup>, is all that is necessary to avoid hypotension. Nevertheless it has to be accepted that in the patient with no adrenal function at all, adrenal failure is a dire emergency, with severe consequences. Even in such cases, supraphysiologic replacement is unnecessary and has no advantages<sup>8</sup>.

Many practitioners feel that the use of large doses of steroid in the peri-operative period is relatively innocuous and justified because of the risk of hypotension. The published literature does not support this viewpoint<sup>9</sup>. The acute side effects of steroid therapy are well documented and carry with them the risk of serious patient morbidity and mortality. Impaired wound healing, immunosuppression, nondepolarising muscle relaxant interactions, arrhythmias, acute myocardial infarction, bowel perforation, pancreatitis, peptic ulceration and neuropsychiatric disturbance are well described.

One also has to bear in mind that much research and effort has been put into the concept of providing "stress free" anaesthesia. Why, through use of opiate analgesics and regional anaesthesia<sup>10</sup>, where reduction of peri-operative cortisol levels has been documented, have patients been demonstrated to have better outcomes? The benefits of the stress response are tenuous and decreasing it does improve outcome<sup>11</sup>. Surely, it does not make sense to provide "stress free" anaesthesia to a large proportion of the anaesthetic population, and then provide enormous levels of stress hormone, to patients who have been receiving steroid therapy? Somewhere there must be an error in our understanding.

Current wisdom suggests that patients need only receive supplementation in order to provide levels of cortisol commensurate with those in normal individuals, mounting a stress response to surgery. In patients who have not received steroids within the past 3 months, there is no evidence that supplementation is necessary, irrespective of the dose that has been administered.

Logic dictates that the minimal amount of steroid replacement,

rather than supraphysiologic doses will optimize postoperative recovery and avoid deleterious side effects<sup>6,7</sup>. For patients receiving less than the equivalent of 10mg of prednisone daily supplementation is unnecessary, only the routine daily dose need be administered if convenient. For patients receiving more than 10mg a day the current guidelines are as follows<sup>10</sup>:

- For minor surgery the usual dose can be given preoperatively or alternatively 25mg of hydrocortisone can be administered as a single dose.
- For moderate surgery the usual dose of steroid (or 25mg of hydrocortisone) is to be administered, followed by the equivalent of 100mg of hydrocortisone in the following 24 hours.
- Patients undergoing major surgery should receive their usual dose of steroid and 25mg of hydrocortisone at induction to be followed by the equivalent of 100mg of hydrocortisone daily for 3 days.
- Individuals receiving high dose immunosuppressant doses of steroid need only receive their usual dose or its equivalent. In these patients dosing is already highly supra physiologic and additional drug is not indicated.

It must be borne in mind that patients who have no adrenal function and receive mineralocorticoid supplementation (fludrocortisone), are at high risk of acute Addisonian crisis, and must always receive mineralocorticoid therapy as well as glucocorticoid supplementation.

In summary, steroids are not innocuous agents, carrying with them the risk of many acute side-effects. Low dose physiologic substitution is currently advocated as per the guidelines outlined above. The old practice of supraphysiologic substitution and the attitude that a little extra steroid never did anyone any harm is to be deprecated. An attempt to mimic the natural production of cortisol in the peri-operative period would appear to be common sense, questioning the current widespread practice of the use of supra-physiologic regimens.

## References

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