Primary brain tumours, although fairly uncommon (8 per 100,000 per year) comprise the 8th most common cancer of people of working age (16-65) and the fifth most common cause of death from cancer in under 65s. The mainstay of treatment for primary brain tumours is surgical excision and radiotherapy, and in two thirds of patients, steroids (dexamethasone) is used to reduce intracranial pressure as headache and vomiting. Long term use of high dose exogenous steroids in such a manner can cause suppression of the hypothalamic-pituitary-adrenal (HPA) axis impacting both on corticotrophin-releasing hormone (CRH) and adrenocorticotropic hormone (ACTH) as demonstrated below. With prolonged suppression of the HPA axis, adrenal glands eventually atrophy and can take months to years below.

Dexamethasone-related adrenal insufficiency in patients with solid brain tumours

**INTRODUCTION**

Although corticosteroids like dexamethasone are used to treat peritumoral oedema, there are currently no specific guidelines on their use (i.e. dose and duration). The endocrinology department at the University Hospital Birmingham identified a gap in literature regarding the relationship between adrenal insufficiency and long term steroid use in patients being weaned off steroid regimens. They believe that it is important to determine whether the lack of steroid replacement is biochemically by a failed short synacthen test (SST). This involves taking a basal level of cortisol, then giving 250g synacthen either i.v. or i.m. Samples of cortisol are then taken at 30 minutes. A failed SST is the inability to raise serum cortisol over 550nmol/L at 30 minutes.

**RATIONALE**

The primary aim was to determine the relationship between adrenal insufficiency and long term steroid exposure. The pass and fail groups were compared initially with respect to variables: Baseline cortisol, 30 minute cortisol, Mean dose, Mean duration, Total steroid exposure. A Mann-Whitney U test compared whether there was a significant difference between the pass and fail groups for the aforementioned variables. Scatterplots show, in all categories, the null hypothesis was rejected; there was a significant difference between those who passed their SST and those who failed.

Dexamethasone-related adrenal insufficiency in patients with solid brain tumours. 100,000 per year) comprise the 8th most common cause of death from cancer in under 65s.

**AIMS AND OBJECTIVES**

1. To determine the median dose, duration and dexamethasone exposure in both groups: those who passed their SST and those who failed.
2. To determine whether there is a significance difference in the baseline cortisol, 30 minute cortisol, median dose, median duration and median total steroid exposure between the 2 groups.
3. To propose a dose and/or duration of steroid exposure that may prevent adrenal insufficiency.

**METHODS**

A retrospective patient record study of all patients who had SSTs between October 2010 and October 2012 was undertaken. Informatics used specific clinic codes to identify patients who had attended brain tumour endocrinology clinics. After review on clinical portal, a total of 78 patients were obtained that fit the selection criteria. Of this study population of 78, 53 patients passed their SST and 25 failed.

**RESULTS**

**BIOCHEMISTRY RESULTS**

<table>
<thead>
<tr>
<th>PATIENTS</th>
<th>PASS</th>
<th>FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. OF PATIENTS</td>
<td>53</td>
<td>25</td>
</tr>
<tr>
<td>SEX</td>
<td>M/F</td>
<td>22:31</td>
</tr>
</tbody>
</table>

**INFORMATION**

Information on demographics, diagnosis, baseline and 30 minute cortisol, steroid type, dose and duration of treatment was obtained for each patient. Every time the dose was altered, this was recorded to give an accurate calculation of the total steroid exposure. Statistical analysis was then carried out to see if there was any significant difference between the pass and fail groups.

**SERIAL CHI-SQUARE TESTS**

**DISCUSSION**

In the pass group 62% of the subjects (33 out of 53 patients) had a mean dose of 0mg dexamethasone i.e. no exposure to steroids. Therefore, Spearman’s and Pearson’s tests were also carried out on those patients in the pass group who had been exposed to steroids only (the 33 patients who had not been excluded from this correlation). This was done to determine whether the lack of steroid exposure in the pass group had an impact on the results. No significant difference was found however between those on dexamethasone and those who were not exposed. A comparison of pass and fail groups showed that there was still a significant difference in duration and exposure. This strengthens the point that the groups are indeed different, independent of the lack of steroid exposure in the pass group.

**REFERENCES**

- Improving outcomes for people with brain tumours and other CNS tumours. NICE, NHS, 2008.