Hormonal therapies and meningioma: a UK primary care study

Lucía Cea-Soriano¹, Tilo Blenk², Mari-Ann A Wallander²,³ and Luis A García Rodríguez¹

¹Spanish Centre for Pharmacoepidemiologic Research (CEIFE), Madrid, Spain; ²Global Epidemiology, Bayer Pharma AG, Berlin, Germany and ³Department of Public Health and Caring Science, Uppsala University, Uppsala, Sweden
Disclosures

- Lucía Cea-Soriano and Luis A García Rodríguez work for the Spanish Centre for Pharmacoepidemiologic Research (CEIFE), which has received unrestricted research grants from Bayer Pharma AG
- Tilo Blenk was an employee of Bayer Pharma AG, Berlin, Germany at the time of this study
- Mari-Ann Wallander is an employee of Bayer AB, Solna, Sweden
Meningioma: typically benign tumours of the brain and spinal cord
- ~20% of intracranial tumours are meningioma
- ~90% of meningiomas are intracranial

Largely unknown aetiology
- Known risk factors: exposure to ionising radiation and chromosomal deletions

Hormones may play a role in the development of meningiomas
- More common in women – female-to-male ratio up to 3.5:1
- Progesterone, oestrogen and androgen receptors in some meningiomas
- A suggested association between breast cancer and meningioma
Study objectives

- Explore the possible association between hormonal therapies and the risk of developing meningioma in a large primary-care-based population
- Estimate the incidence of meningioma
The Health Improvement Network

- Medical research database of systematically recorded anonymous patient records
- Validated for use in pharmacoepidemiology\(^1\)
- Contains details on almost 3 million patients currently registered with primary care physicians (PCPs) in the UK
- Prospectively recorded information on patient:
  - demographics
  - medical history
  - prescriptions
  - additional health data

Selection of study cohort

Study period: January 1996 to June 2008
Individuals aged 12–89 years at any point
Study population: 2,171,287 patients
14,059,934 person-years

Potential incident meningioma cases
n = 798

Case validation by PCP
n = 521
PCP questionnaire and manual review of THIN free-text comments
(n = 500)
Non-cases ascertained
47
Cases ascertained
n = 453

No case validation by PCP
n = 277
Manual review of THIN free-text comments
(n = 277 + no questionnaire n = 21)
Cases ascertained
n = 292
Non-cases ascertained
6

Total cases
n = 745
Overall incidence of meningioma per 100,000 person-years

- Females: 7.19 (95% CI: 6.62–7.82)
- Males: 3.05 (95% CI: 2.65–3.51)
- Overall: 5.30 (95% CI: 4.93–5.69)
Meningioma incidence per 100 000 person-years over the entire study period according to patient age

- **Age (years)**: 12–19, 20–29, 30–39, 40–49, 50–59, 60–69, 70–79, 80–89
- **Incidence per 100 000 person-years**

**Legend**:
- Female
- Male
- Total
No significantly increased risk of meningioma was found among female users of OC, HRT or low-dose CPA compared with non-users.

Odds ratio for female users vs non-users:
OC 1.15 (CI: 0.67–1.98); HRT 0.99 (CI: 0.73–1.35); low-dose CPA 1.51 (0.33–6.86)
Hormone-related comorbidities and meningioma risk

No significant increase in the risk of developing meningioma among female patients with breast cancer or genital cancer compared with those who did not have these conditions.

*Includes cancer of the cervix, uterus, endometrium, ovary, fallopian tube vagina, labia, vulva and clitoris.
Meningioma in male patients

Significantly increased risk of meningioma among male users of androgen analogues and among users of high-dose CPA compared with non-users.

<table>
<thead>
<tr>
<th>Group</th>
<th>Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate cancer</td>
<td></td>
</tr>
<tr>
<td>Past</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>Ever</td>
<td></td>
</tr>
<tr>
<td>CPA</td>
<td></td>
</tr>
<tr>
<td>Past</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>Androgen analogues</td>
<td></td>
</tr>
<tr>
<td>Past</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>Anti-androgen</td>
<td></td>
</tr>
<tr>
<td>Past</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>LHRH agonists</td>
<td></td>
</tr>
<tr>
<td>Past</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
</tr>
</tbody>
</table>

Bayer HealthCare
Conclusions

- Meningioma incidence was twofold higher in women than men.
- No association between development of meningioma and HRT.
- No link between meningioma and OC use in women.
- Increased risk of meningioma in male patients using androgen analogues and high-dose CPA.
  - The results should be interpreted with caution: very small number of cases.
Thank you!
Back up
A graded effect was observed: $p < 0.001$ for trend, for each variable.