Blood pressure monitoring in psychiatric inpatients with bipolar affective disorder

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People with bipolar affective disorder are at increased risk of hypertension, but cardiovascular health screening practices in mental health services are inconsistent and often sub-optimal. Here, the authors describe their audit to identify adults with bipolar affective disorder and comorbid hypertension in an acute psychiatric inpatient unit, and to establish the unit’s level of compliance with local and national guidelines with regard to blood pressure monitoring.

Bipolar affective disorder is a severe mental illness associated with significant functional impairment and excess mortality. Life expectancy is reduced by between 8–13 years compared to the general population; the most frequent cause of premature death is cardiovascular disease, followed by suicide and cancer. Cardiovascular disease accounts for over a third of deaths in people with bipolar affective disorder. Bipolar affective disorder places a significant burden on society; illness-related direct and indirect costs are estimated to be £4.5 billion in the UK.

Bipolar affective disorder is an episodic illness characterised by periods of depressed and elevated or irritable mood, interspersed with periods of recovery, and affects about 1–2% of people. It is increasingly recognised that a significant proportion of people continue to experience residual depressive symptoms in the medium to long term. For the majority, the illness begins in early adulthood and affects about 1–2% of people. For women, the first episode is often depressive in nature.

Hypertension, defined as a persistently raised blood pressure, with systolic or diastolic blood pressure measurements above 140/90mmHg respectively, is a common and serious medical condition that affects around 30% of adults in England. Its prevalence, however, increases with age, so that over 50% of people aged 55–65 years are affected. Systolic hypertension is more common in the elderly, while diastolic hypertension is more frequently found in people below the age of 40–50 years. Hypertension is divided into two main categories: namely primary hypertension where no identifiable cause can be found, and secondary hypertension caused by, for example, endocrine disease, kidney disease and cardiovascular conditions such as coarctation of the aorta.

The importance of hypertension is linked in part to its impact on other pathology. Hypertension is a major risk factor for cardiovascular
Blood pressure in bipolar affective disorder

Aims

The aims of this audit were: (1) to identify the proportion of patients with bipolar affective disorder who were admitted to an acute adult psychiatric unit and who were also known to have comorbid hypertension; (2) to establish current local clinical practice in respect of blood pressure monitoring in this patient population at the time of admission; and (3) to establish the unit’s compliance with local and national screening and management standards.

Method

After approval by the Northamptonshire Healthcare Foundation NHS Trust Audit Committee, we audited the population of working-age adult patients with a primary ICD-10 diagnosis of bipolar affective disorder admitted to the acute inpatient unit at Berrywood Hospital over a 12-month period between March 2011 and March 2012. Suitable patients were identified from electronic patient records based on clinician coding and data retrospectively extracted from the electronic patient notes.

Data collected included demographics, legal status, clinical characteristics, medication prescribed, and physical examination parameters including body mass index (BMI) and blood pressure measurements. Data were pseudonymised. Clinical standards were based on local clinical practice. Data were retrospectively extracted from the electronic patient notes.

Results

Demographic, legal and clinical characteristics

Demographic, legal and clinical characteristics are detailed in Table 2. A total of 36 patients with a primary diagnosis of bipolar affective disorder were admitted to the acute inpatient unit over the 12-month period.

Risk factors for hypertension were identified in a significant proportion of patients. Just under a third were smokers (10 of 36) and half (18 of 36) were known to use alcohol. Of those who used alcohol, just under a third (5 of 18) admitted to using alcohol excessively. Just under half of patients (15 of 36) had a BMI recorded at admission, with over two-thirds (11 of 15) overweight or obese. A significant proportion of patients (just under half) with established hypertension also had diabetes mellitus.

Identified hypertension at the time of admission

Just under a fifth of patients (7 of 36; 19.4%) were correctly identified on admission to already be known to have hypertension. In that small group, there was no significant difference between the proportion of those with hypertension who presented with either a hypomanic/manic or depressive episode ($\chi^2=0.08, p=0.71$). There was also no significant association between gender and the presence of hypertension ($\chi^2=0.2, p=0.33$).

Blood pressure monitoring practice

Three-quarters of patients (27 of 36) had their blood pressure recorded at the time of admission. The reason for failing to record the blood pressure was only given in three of the nine who did not, the reason for all listed as patient refusal. Of the nine patients who did not have their blood pressure measured at the time of admission, only two had their blood pressure measured later in the course of their inpatient stay.

Half of blood pressure recordings at the time of admission (14 of 27) were elevated, yet further action...
was taken in less than half of cases (6 of 14). One patient had a physical health care plan in their notes, though no further blood pressure measurements were recorded; two patients had repeated blood pressure measurements and were found to be normotensive; and three had sustained hypertension on repeated measurement, of whom one was referred to primary care, while two patients had no further action taken regarding their blood pressure.

**Discussion**

We identified seven (19.4%; approximately 1 in 5) adult bipolar affective disorder patients with known hypertension. Our findings are consistent with previous studies where prevalence rates of hypertension in patients with bipolar affective disorder range between 18–39%. Although the study sample is modest in size, leading to the possibility that it lacked statistical power, the sample audited nevertheless represents all consecutive inpatient admissions with bipolar affective disorder over a 12-month period to this psychiatric unit that covers a population of over 200,000. It is representative of that unit’s operational practice and should be generalisable to similarly sized units.

We identified the frequent presence of risk factors for both hypertension and cardiovascular disease in our patient population. The main risk factor for the development of hypertension is obesity, and in particular abdominal distribution, elevated in those with bipolar affective disorder, with every percentage increase in body mass index (BMI) being associated with a 6.5mmHg increase in systolic blood pressure.

Diabetes and hypertension commonly co-occur and share aetiological factors such as obesity and physical inactivity, with the estimated prevalence of hypertension in diabetes being between 30–80%. In hypertensive patients, the presence of the metabolic syndrome, a cluster of cardiovascular risk factors, exacerbates cardiovascular risk, further worsening prognosis.

The majority of our audited acute inpatient population was prescribed psychotropic medicines, often in combination. These medicines have a variety of effects on blood pressure. Antipsychotics most often lower blood pressure, in particular causing orthostatic hypotension, although some, most notably clozapine, also have a propensity to elevate blood pressure, probably through an affinity for alpha2-adrenergic receptors.

Of the antidepressant medicines, the tricyclics (TCAs) and serotonin-noradrenergic reuptake inhibitors (SNRIs) are associated with hypertension, through noradrenergic potentiation. Mood stabilisers such as lithium and sodium valproate are not associated with blood pressure effects directly. Importantly, however, most psychotropic medicines – including antipsychotics, antidepressants and mood stabilisers – can cause weight gain, which is itself an important risk factor for the development of hypertension.

In people with bipolar affective disorder specifically, the increased risk of hypertension and cardiovascular disease is likely to be driven by the convergence of multiple factors including genetic, lifestyle, metabolic and medication related factors. When estimating cardiovascular risk, it is important to consider the interactions between multiple risk factors and how these may change in different populations. It has been estimated that the impact of cardiovascular risk factors in patients with severe mental illness, including bipolar affective disorder, is of an order two to three times greater than in the general population. These considerations emphasise the importance of screening and intervening.

In our audit, three-quarters of patients had their blood pressure measured at the time of admission.

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**Table 2.** Demographic, legal and clinical characteristics of patients with a primary diagnosis of bipolar affective disorder (n=36)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Median (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>46 (25–75)</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>24 (5–249)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9 (25.0)</td>
</tr>
<tr>
<td>Female</td>
<td>27 (75.0)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>31 (86.1)</td>
</tr>
<tr>
<td>Black Caribbean</td>
<td>1 (2.8)</td>
</tr>
<tr>
<td>Asian</td>
<td>2 (5.6)</td>
</tr>
<tr>
<td>Mixed</td>
<td>2 (5.6)</td>
</tr>
<tr>
<td>Legal status</td>
<td></td>
</tr>
<tr>
<td>Informal</td>
<td>27 (75.0)</td>
</tr>
<tr>
<td>Section 2 MHA (1983)</td>
<td>8 (22.2)</td>
</tr>
<tr>
<td>Section 3 MHA (1983)</td>
<td>1 (2.8)</td>
</tr>
<tr>
<td>Current clinical episode</td>
<td></td>
</tr>
<tr>
<td>Hypomanic</td>
<td>5 (13.9)</td>
</tr>
<tr>
<td>Manic</td>
<td>15 (41.7)</td>
</tr>
<tr>
<td>Without psychotic symptoms</td>
<td>7</td>
</tr>
<tr>
<td>With psychotic symptoms</td>
<td>8</td>
</tr>
<tr>
<td>Mixed</td>
<td>2 (5.6)</td>
</tr>
<tr>
<td>Depressive</td>
<td>13 (36.1)</td>
</tr>
<tr>
<td>Mild to moderate</td>
<td>7</td>
</tr>
<tr>
<td>Severe without psychotic symptoms</td>
<td>3</td>
</tr>
<tr>
<td>Severe with psychotic symptoms</td>
<td>3</td>
</tr>
<tr>
<td>Unspecified</td>
<td>1 (2.8)</td>
</tr>
<tr>
<td>Psychotropic medication</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>3 (8.3)</td>
</tr>
<tr>
<td>Antipsychotics only</td>
<td>6 (16.7)</td>
</tr>
<tr>
<td>Antidepressants only</td>
<td>4 (11.1)</td>
</tr>
<tr>
<td>Mood stabilisers only</td>
<td>4 (11.1)</td>
</tr>
<tr>
<td>More than one in combination</td>
<td>18 (50.0)</td>
</tr>
<tr>
<td>Unknown (no data available)</td>
<td>1 (2.8)</td>
</tr>
</tbody>
</table>
Likely barriers to effective screening include that the point of admission appears to be the only point at which a physical examination will occur, yet will typically not present the ideal circumstances to measure this parameter, and results may be interpreted in that light. Follow-up measurements are all too often missed, and typically represent a system level failure to be aware of and act on abnormal physiological parameters. When abnormalities are detected, their management requires: patients’ variable capacity to make informed evidence-based decisions; and their ability and willingness to engage and comply with repeated and sometimes intrusive physical health monitoring, especially in the context of the acute phase of a mental illness, where other aspects of treatment may be imposed, and where risk of violence to oneself or others typically dominates clinical priorities. All these factors act to skew limited clinical resources to focus on other areas of need. Additional barriers include clinicians’ lack of awareness of physical health risks and lack of confidence in managing physical health problems in patients with affective disorder.

A significant proportion of audited patients had elevated blood pressure readings, but further action was taken in less than 50% of patients. The question is why, and how to address that. Many factors can influence blood pressure readings including equipment, the circumstances and the environment, and patient-specific factors. Blood pressure readings (including systolic and diastolic) should be repeated sequentially, but particularly so where initial readings are elevated. If those readings are persistently elevated, then ambulatory monitoring is recommended to establish a diagnosis of hypertension.17

Our audit focused specifically on acute inpatient admissions. Intensive home treatment teams provide an alternative to hospital admission. It also represents an opportunity for physical health screening. However, this is unlikely to be without operational challenge, as patients who remain in the community inevitably occupy a grey area of indistinct clinical responsibility between secondary mental health services and primary care. These differences are perhaps exaggerated by the typically time-limited engagement; in addition, team therapists are often not trained in physical medicine, or often see patients at home, perhaps alone, without a chaperone, and without equipment, thus that the treatment environment does not lend itself to thorough physical assessment. Despite these challenges, however, it is clear that mental health teams in whatever setting need to take a greater role in optimising their patients’ physical health.

Conclusions

Our audit highlighted the need for increased awareness among inpatient psychiatrists and nurses of the risk of hypertension in bipolar affective disorder, and of the importance of effective screening. Hypertension is a readily modifiable cardiovascular risk factor. Psychiatrists and GPs need to recognise and accept that correctly identifying physical health risks is as much an essential part of the assessment and management of affective disorders, as are assessing and managing mood and risk. Blood pressure measurement should form part of the overall physical health assessment in those with mental illness.

Teams need to develop action plans to follow up, investigate and address elevated blood pressure measurements and hypertension where it is identified. As a direct consequence of the findings of this audit, we have designed a simple hypertension screening and management guide for all inpatient admissions. It will be implemented across the service after clinician feedback sessions to then be re-audited.

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Declaration of interests

MK holds shares in GlaxoSmithKline.

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