Monitoring patients on high-dose antipsychotics

Joan M. Barber, Jennifer Connaughton and Morag Wright

Aims and method Following the publication of the 1994 Consensus Statement on the use of high-dose antipsychotic medication, we identified our high-dose patients and undertook an audit of the recommended physical investigations. The patients were identified by scrutiny of prescription records. Data were collected retrospectively at six-monthly intervals for four audit cycles. Results were fed back to clinicians at the hospital journal club.

Results The percentage of patients identified in the high-dose category fell from 35 to 23% over 18 months. Electrocardiograph monitoring of the group increased from 5 to 63%. Other tests showed a similar improvement. A very small number of abnormal results was shown. There were no untoward cardiac events.

Clinical implications Introduction of the standards of physical monitoring advised in the Consensus Statement has implications of cost to the NHS to be balanced against risk avoidance for patients. The number of abnormalities detected in our population was low. Changing prescribing behaviour in response to reported abnormal findings proved unexpectedly slow and a new system was required.

In 1994, the Royal College of Psychiatrists produced a consensus statement on the use of high-dose antipsychotic medication (Thompson, 1994). This document described concerns that some patients were given medication at doses in excess of the *British National Formulary* upper limits and that some sudden deaths might be due to medication. When discussing unexpected sudden cardiac deaths, it was acknowledged that the link with neuroleptic medication was suspected but as yet unproven. Mechanisms by which neuroleptics might be implicated in sudden cardiac deaths included cardiac conduction abnormalities and a negative inotropic effect. Physical monitoring of patients on high-dose antipsychotics was suggested as a means of safeguarding them from the risks of high-dose treatment.

Using the guidelines, attempts at audit in this area (Cornwall *et al*, 1996, Krasucki & McFarlane, 1996) have revealed a substandard level of monitoring at initial survey and logistical difficulties in obtaining some tests on remote sites. Reassuringly, audit can bring about improvements in clinical practice, physical monitoring of patients and a reduction in the proportion of patients on high-dose medication.

The State Hospital, Carstairs, provides in-patient care in a medium and maximum secure setting for the forensic psychiatric population of Scotland and Northern Ireland. Thomson & Bogue (1994) described the in-patients as a relatively young group with severe, long-standing, psychotic illness (average age 34 years, 70% diagnosed as suffering from schizophrenia, average nine years of in-patient psychiatric care).

This project aimed to identify patients in the State Hospital on high-dose antipsychotics and to see if they were being monitored within the College guidelines.

The study

Definitions of high-dose antipsychotics and a standard for physical monitoring against which to audit were based on the Consensus Statement (Thompson, 1994) and agreed among the authors as:

High-dose antipsychotics

(a) For monotherapy, dosage in excess of the product licence for that drug.
(b) For a combination of antipsychotics, total daily dosage equivalent to 1000 mg chlorpromazine or more.

Physical monitoring

(a) An electrocardiograph (ECG) at least at three-monthly intervals.
(b) Serum urea and electrolytes at least at three-monthly intervals.
(c) Temperature, pulse and blood pressure measurements as dictated by the physical state of the patient, but at least at three-monthly intervals.

Patients on regular high-dose antipsychotics were identified using the above criteria and prescribing data routinely collected by the hospital pharmacist. Conversion to equivalent doses of chlorpromazine was performed using standard tables (Bazire, 1996). This method was used on each occasion that data were examined during the project.

https://doi.org/10.1192/pb.22.11.671 Published online by Cambridge University Press

The initial survey took place in May 1995. Patients identified as being on high-dose antipsychotics had their case notes examined retrospectively for evidence of physical monitoring in the preceding three months. The results were presented to the medical staff at a journal club meeting and it was subsequently decided to implement the guidelines in respect of patients who were prescribed high-dose antipsychotics. The survey was repeated using the same method in December 1995.

By the time of the third survey in June 1996, a formalised system of patient identification and monitoring had evolved. The pharmacist labelled the drug charts of patients on high-dose antipsychotics, alerting prescribers and nursing staff to the patient's status. The pharmacist also supplied a list of the names of these patients to the medical centre coordinator so that appropriate monitoring could be arranged. A letter of explanation to patients was introduced in an attempt to reduce the refusal rate, particularly for ECGs. The survey method was altered at this point so that the medical centre records of monitoring measures were examined rather than patients' case notes. The final survey, of the results from December 1996, took place in March 1997.

Findings

Men out-number women by approximately 10 to one (see Table 1). Three-quarters of the patients were prescribed regular antipsychotic medication. The proportion of patients on high-dose antipsychotics, expressed as a percentage of the total number of patients on medication, decreased during the time of the audit. On average, females were prescribed larger doses of medication (see Table 2). Average daily doses fell progressively from May 1995 to December 1996, with overall a 20% reduction.

The level of physical monitoring (see Table 3) improved from June 1996 onwards, coinciding with the introduction of a system of identifying patients. The improvement continued into the December 1996 survey with the exception of measurement of serum urea and electrolytes, which fell, but was still better than the level at initial survey.

Electrocardiograph abnormalities which were detected (see Table 4) were concerned with conduction and evidence of prolonged $Q–T_c$ was found. As the level of ECG monitoring improved, the percentge of abnormalities found increased.

Comment

Dosage

The results obtained for daily dosage potentially underestimate the dose a patient receives. Only routine medication was considered. Patients could become 'high-dose' through use of discretionary medication and would not be counted by this method. This group of patients, on high-dose medication for brief periods during deterioration

Table 1. General results of the four surveys

	May 1995	Dec. 1995	June 1996	Dec. 1996
Number of patients	219	223	226	227
Male : female	199 : 20	203 : 20	210 : 16	212 : 15
Number on antipsychotics	168	173	169	170
Number on high-dose antipsychotics	59 (35.1%)	63 (36.4%)	53 (31.4%)	40 (23.5%)

Table 2. Average daily dose (mg chlorpromazine equivalent) (range)

	May 1995	Dec. 1995	June 1996	Dec. 1996
All patients on antipsychotics	1113 (75–5000)	1029 (50–4500)	965 (40–4000)	901 (10–3500)
Females on antipsychotics	1224 (200–3500)	1061 (150–4500)	976 (175–3000+)	968 (10–3000+)
Males on antipsychotics	1103 (75–5000)	1026 (50–4000)	964 (40–4000)	896 (40–3500)

Table 3. Physical monitoring of high-dose patients (number of recordings)

	May 1995 *n* (%)	Dec. 1995 *n* (%)	June 1996 *n* (%)	Dec. 1996 *n* (%)
Electrocardiograph	3 (5.1)	0	24 (45.2)	25 (62.5)
Urea and electrolytes	10 (16.9)	13 (20.6)	33 (62.2)	17 (42.5)
Temperature	7 (11.8)	3 (4.8)	19 (35.8)	24 (60)
Pulse	17 (28.8)	10 (15.9)	19 (35.8)	24 (60)
Blood pressure	17 (28.8)	15 (23.8)	22 (41.5)	24 (60)

https://doi.org/10.1192/pb.22.11.671 Published online by Cambridge University Press

Table 4. Electrocardiograph abnormalities detected

	June 1996	Dec. 1996
Number of recordings	24	25
Average Q–T_c (msec)	422	427
Range	390–462	382–474
Patients with Q–T_c at least 440 msec	4 (16.6%)	9 (36%)

in their mental state or behaviour, seems to be a group targeted by the Consensus Statement. Modification of the flagging system may be needed so that prescribers are alerted to potential high-dose patients.

The proportion of patients on high-dose antipsychotics remained the same in the first two surveys but began to fall by June 1996. Over the period of the audit cycles, the percentage fell from just over one-third to under a quarter. Even the latter figure is a high proportion of the patients on antipsychotics, and merits further investigation. There is relatively little written about prescribing practices in forensic settings, but it is a widely held perception that large doses of neuroleptics are used for longer periods. Fraser & Hepple (1992), who surveyed prescribing habits in Broadmoor and compared their data with previous surveys in Oxford, Birmingham and Malvern, found that the prescribing habits of doctors in Broadmoor did not differ markedly from those in other psychiatric hospitals serving similar patient groups. Thirty-eight per cent of their male patients were prescribed total doses in excess of 1000 mg per day, a finding comparable with our initial results.

Increasingly, evidence is emerging that treatment-resistant patients do not benefit from ever larger doses of neuroleptics. This study attempted to examine the monitoring of the physical rather than the clinical state of patients on high-dose antipsychotics. It did not look at the response of patients to high-dose treatment. Our results would suggest that the clinical justification for prolonged high-dose prescribing should be further investigated, a question meriting a study in its own right.

The prescribing survey showed a significant use of new antipsychotics, the safety of which has been more rigorously tested in clinical trials. The survey revealed a tendency to introduce new antipsychotics while continuing previous antipsychotic medication (with the exception of clozapine). This combination of antipsychotics may not only increase the risk of complications but also not maximise benefit from using drugs with a lower incidence of extrapyramidal side-effects. These results perhaps indicate a need to survey the prescribers involved to clarify the reasoning behind such practice.

Physical monitoring

The physical monitoring of patients on high-dose antipsychotics was minimal in the surveys of May and December 1995. Patients are routinely offered an annual physical examination, which some refuse. The bulk of the monitoring recorded in the first and second surveys was attributable to this examination rather than to a perceived need for monitoring because of a patient's high-dose status.

By June 1996, the more formalised system showed an increase in the number of patients receiving some form of physical monitoring. The biggest improvements appeared in the area of ECG recordings. By this stage it was also possible to examine the reasons why monitoring had not taken place. Problems such as the unavailability of an ECG technician, patient refusal and recent increases in medication featured as the most common reasons for failure to obtain an ECG within the target time period.

Abnormalities detected

Blood tests detected minor electrolyte abnormalities, many of which had been detected in previous tests. ECG tracings revealed Q–T_c prolongation (440 msec or more) in some cases. All of these patients were on combinations of two or more antipsychotics. Follow-up of the four patients with prolonged Q–T_c in the survey of June 1996 showed that two had their dosage reduced through monotherapy with clozapine. One had been discharged on high-dose antipsychotics and one had a further increase in medication and refused monitoring in the three months prior to December 1996. Of the nine patients with Q–T_c prolongation in the survey of December 1996, three had their medication reduced, while six were unchanged – had the Consensus Statement been fully adhered to, the dosage would have been reduced. This may imply a need to notify prescribers more effectively about abnormalities. It remains to be seen how commonplace Q–T_c prolongation is in a population on high-dose medication and also if this abnormality progresses with time. Continuation of the monitoring process will provide information on both questions.

In this study to date, no adverse cardiac events have been observed in patients on high-dose antipsychotics. Just over 100 patients have been identified as being on high-dose antipsychotics at some point during the two years of the study. Eleven of these appear to have been on high-dose antipsychotics throughout the two-year period. It may be that patients stabilised on high-dose antipsychotics do not need monitoring as frequently as patients on high doses do acutely, but until there is sufficient evidence to this effect, a case cannot be made for change.

https://doi.org/10.1192/pb.22.11.671 Published online by Cambridge University Press

Other implications

The standard for physical monitoring included measurement of urea and electrolytes, as the Consensus Statement argued that electrolyte disturbance made a patient more likely to develop a cardiac arrhythmia and increased the risk of sudden death. As antipsychotics can affect the liver and have been associated with blood dyscrasias, future monitoring could be extended to include three-monthly full blood count and liver function tests. At present all patients have an annual physical examination including these tests. It is questionable whether the added costs involved would be justified.

As ECG and blood monitoring have become more commonplace for high-dose patients, problems of increased workload and financial cost have arisen. The State Hospital is located in a rural area, routine blood samples are sent for analysis to a hospital 18 miles away, while the ECG service is provided by another hospital nine miles away, sending a technician on an as required basis. With the introduction of regular ECG monitoring, the number of requests increased 20-fold and the availability of the technician declined owing to departmental staffing problems in the general hospital. Delays occurred in the receipt of reports. Problems also exist with the organisation of blood sampling and the acceptability of all tests to patients. This had led to a search for a more efficient service. Options considered include the training of existing staff in phlebotomy and ECG tracing and the use of a fax or modem link to facilitate more rapid ECG reporting.

Conclusion

Introducing audit of the physical monitoring of patients on high-dose antipsychotics adopting the standards suggested in the Consensus Statement and the development of a system of patient identification, has increased the amount of monitoring taking place.

It may eventually provide information on the physical effects of long-term use of high-dose antipsychotic. It has also raised questions of how to continue the monitoring process in the most cost-effective manner possible, how best to convey information to responsible medical officer so that results can be acted upon, and how to reduce the level of refusal of tests. Having found that ECGs with $Q–T_c$ prolongation were not always acted upon timeously, we have now devised a method of flagging up these results to responsible medical officers. This will be audited in the next cycle.

Changing prescribing habits is well known to be difficult (Clark & Holden, 1987). Clinical audit is widely supposed to be effective, although scientific evidence, including controlled trials, for the effectiveness of what is now national policy remains relatively sparse. We have found that introducing changes in prescribing for individual patients in response to feedback has perhaps been slower than anticipated and suggests the need to heighten the impact of the findings. However, the general trend towards lower doses of neuroleptic medication over the period of the survey has been maintained. There may be several reasons for this, including the possibility that increasing awareness of a patient's high-dose status leads to more cautious prescribing. A causal link between our audit results and any change in practice cannot be proven from the methodology adopted and other sources of information may have had an impact on prescribing over the period of the audit. We did not examine the reasons for the trend and we hope to amend the data collection to include this in future.

Acknowledgements

Sincere thanks to Julie Barr, Medical Centre Co-ordinator, for her many hours of work developing a practical monitoring system. Thanks also to the other staff at the State Hospital and Law Hospital for supporting the project through its various stages, especially to Dr Tom White for his helpful comments on the draft paper.

References

BAZIRE, S. (1996) *Psychotropic Drug Directory 1996*. Dinton: Mark Allen Publishing.

CLARK, A. F. & HOLDEN, N. L. (1987) The persistence of prescribing habits. *British Journal of Psychiatry*, **150**, 88–91.

CORNWALL, P. L., HASSANYEH, F. & HORN, C. (1996) High-dose antipsychotic medication. *Psychiatric Bulletin*, **20**, 676–680.

FRASER, K. & HEPPLE, J. (1992) Prescribing in a special hospital. *Journal of Forensic Psychiatry*, **3**, 311–320.

KRASUCKI, C. & MCFARLANE, F. (1996) Electrocardiograms and high-dose antipsychotic treatment and College guidelines. *Psychiatric Bulletin*, **20**, 326–330.

THOMPSON, C. (1994) The use of high-dose antipsychotic medication. Consensus Statement. *British Journal of Psychiatry*, **164**, 448–458.

THOMSON, L. D. G. & BOGUE, J. P. (1994) *The State Hospital Survey: Final Report*. Edinburgh: University of Edinburgh.

Joan M. Barber, *Senior Registrar, Department of Psychiatry, Southern General Hospital, Glasgow, and* *Jennifer Connaughton, *Consultant Psychiatrist*, Morag Wright, *Pharmacist, The State Hospital, Carstairs, Lanark, Scotland ML11 8RP*

*Correspondence