Monitoring of clozapine assay levels at Reaside Clinic and Hillis Lodge

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Introduction

Following the death of a patient within the organisation who was prescribed clozapine in 2020, some concerns were raised regarding the monitoring of patients on clozapine. In 2020, a trust wide audit was therefore completed looking at the monitoring of patients on clozapine.
The aim of our audit was to repeat the audit at a local level, focussing on the management of clozapine assay levels in patients at Hillis Lodge and Reaside Clinic.

Aim

To compare the management of patients on clozapine to the standards in the Birmingham and Solihull Mental Health Foundation (BSMHFT) guidelines, therefore identifying areas for improvement.

Method

Data was collected on the following information (BSMHFT guidelines) and the target was set at 100%:

- Was the clozapine assay a trough level (12 hours +/- 1 hour after the last clozapine dose)?
- Was the sample appropriate? Was this requested in response to a documented query about one of the following five reasons:
  - Attempting to establish if a dosage is adequate during initiation
  - Making an assessment of recent adherence
  - Attempting to manage emergent tolerability problems
  - Managing drug-drug interactions or change in smoking status
  - When higher doses are being used

Guidance issued by the MHRA in August 2020 set out additional criteria for the monitoring of clozapine levels in certain clinical situations. These include the following (and have not been directly included in the main study results, however a separate analysis included these):

  - *A patient has pneumonia or other serious or systemic infection*
  - *Poor (reduced) clozapine metabolism is suspected*
  - *Toxicity is suspected*
  - *Was the result acknowledged in the electronic notes?*

- Is there a Rio entry in the progress notes or in the MDT review documenting acknowledgement of the result?

Other factors were analysed, including the actual assay level (high/low); who acquired the blood test and whether there was a clearly documented plan for the test.

All of the patients on clozapine (at Reaside Clinic and Hillis Lodge) in March 2021 were identified. All clozapine assay levels done on these patients between January and March 2021 were analysed.

Results

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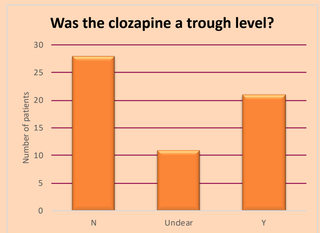
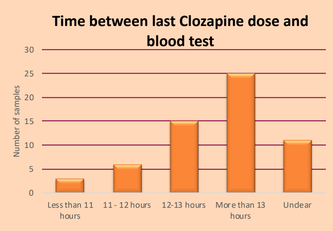
60 samples were identified (22 patients). The results of the main standards looked at within this audit are shown in the following table:

	Trough sample?	Indicated as per the BSMHFT standards?	Rio entry acknowledging the result
Number (%) of samples	21 (35%) Yes 28 (46.7%) No 11 (18.3%) Unclear	10 (16.7) Yes 50 (83.3) No	36 (60%) Yes 24 (40%) No

Results continued

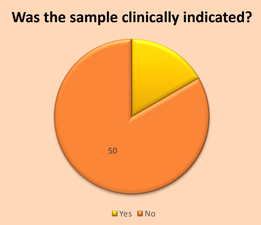
Was the clozapine blood test a trough level?

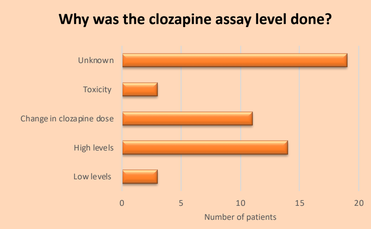




It was noted that 35% of the samples were trough levels and 46.7% were clearly not trough samples. For those that were not trough samples, it appears that the majority of these, 41.7%, levels were measured more than 13 hours after the clozapine dose vs 15% which were taken less than 12 hours after the last clozapine dose. The rest of the data was unclear- 13.3% of the blood results had no time documented and for 5% of the samples, the timing of the clozapine dose was unclear.

Was the sample clinically indicated as per the 5 reasons listed in the BSMHFT guidelines?

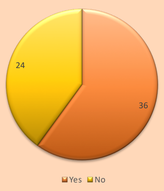




Looking at the 5 indications, 10 of the 60 samples were clinically indicated.

Of the 50 samples, it appears that 14 of these were done due to previously high clozapine levels; 3 were done due to previously low levels; 3 of the samples were done due to a query over toxicity and 11 were done following a change in clozapine dose.

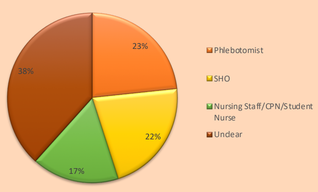
Was the clozapine assay result acknowledged on RIO?



36 (60%) of the samples were acknowledged on RIO.

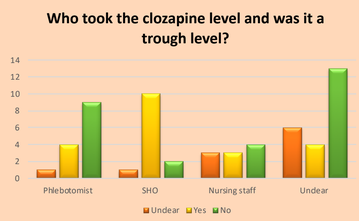
Further analyses:

Who took the sample and was it a trough level?

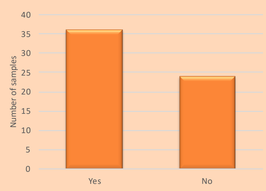


14 of the samples were taken by a phlebotomist; 13 by an SHO; 10 by a nurse/student nurse and for 23 of the samples, it was unclear who took the blood test.

28.6% of the samples taken by a phlebotomist were trough levels. 76.9% of the samples taken by an SHO were trough levels. 30% of samples taken by nursing staff were trough levels.



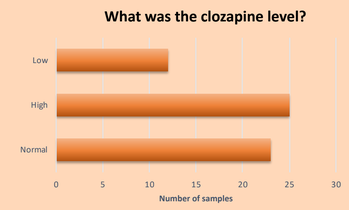
Was the plan to do a clozapine level clearly documented on RIO?

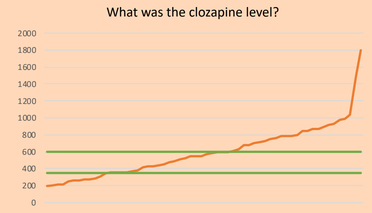


There was a clearly documented plan to do a clozapine level in 36 of the 60 cases.

Results continued

What was the clozapine level?





12 of the clozapine levels were low, 25 levels were high and 23 of the samples were within the normal range. In the second graph, the green lines represent the range for the normal clozapine assay level (350-600mcg/L).

Discussion

1. The results were not near the aspirational target of 100% for each standard. This is likely to be due to various reasons, including a lack of documentation and a lack of understanding amongst staff members.

2. The fact that the majority of blood results were taken more than 13 hours after the last dose suggests that the morning clozapine dose has been suspended (for those on twice daily clozapine). Interestingly, despite the fact that the majority of non-trough samples were delayed (as opposed to being doing too early), 41.7% of the clozapine assay levels were high vs 20% which were low.
The fact that the SHOs tend to take more trough levels than other staff members could be due to a lack of understanding and communication.

3. Of the 60 samples, 16.7% were documented as having a valid reason for the sample (as per the five indications listed in BSMHFT guidelines). If we were to include the other three indications listed by the MHRA, then 21.7% would have met an indication (due to a query over toxicity). The samples that did not meet the indications listed were done due to various reasons, including previously high or low clozapine assay levels or a recent change in clozapine dose. These results suggest a lack of understanding as to when a clozapine assay level is indicated. On the other hand, it is possible that these levels were actually done due to BSMHFT listed indication but that this indication was not documented.

4. 60% of the sample results were acknowledged on RIO. For those results that were not acknowledged on RIO, there had been a clearly documented plan (prior to doing the level) to carry out a clozapine assay level in 50% of cases. This suggests that in 50% of the cases (of no result being acknowledged), clinicians (consultants) may be unaware that the sample has been requested.

Recommendations

1. For all clozapine levels, the following must take place: Date and time of the sample to be recorded on the sample; trough sample taken and results reviewed and documented by a clinician.

2. Clinicians must clearly document the plan to carry out a clozapine assay level along with a clear indication for the assay level.

3. SHOs to carry out the clozapine assay levels blood tests.

An A4 poster has been created and put in the SHO office to remind staff of the above recommendations.

4. An educational presentation (covering the management of patients on clozapine) to be included at the junior doctor induction to the trust.

5. Pathology clozapine forms to be completed as much as possible online.

6. Results of this audit to be shared in the monthly QI meeting and plan to repeat this local audit in April 2022.