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Gaps in Medication Monitoring May Contribute to Death

- *Develop standardized processes for following up (at appropriate intervals) with patients who are taking medications for chronic conditions that require laboratory monitoring.*
- *Educate patients with chronic medical conditions about the importance of lifelong follow-up appointments. For those taking medications that require monitoring, emphasize the need to ensure that this monitoring takes place.*
- *Requests for prescription refill authorization should be scrutinized carefully by both pharmacists, prescribers to ensure that the medication and its dose continue to be appropriate and safe.*
- *Implement standardized processes for communicating test results, including definition of roles and responsibilities both internally, within the clinic/practice, and externally, with laboratories and other testing facilities.*

Hypothyroidism, a chronic condition resulting from low thyroid activity, affects up to 4% of the population. Symptoms of hypothyroidism include fatigue, weight gain, and cold intolerance.[1,2] Levothyroxine, a synthetic form of a thyroid hormone, is the drug of choice for replacement therapy to treat this condition. Although levothyroxine is generally well tolerated, regular blood work is required to monitor thyroid hormone levels and prevent serious adverse events.[3]

As part of ongoing collaboration with several provincial offices of the Chief Coroner or Medical Examiner, ISMP Canada received a report about the death of a woman who was taking levothyroxine but had not undergone monitoring for an extensive period. This bulletin describes the suboptimal follow-up and monitoring of this patient's hypothyroidism and suggests strategies to overcome the challenges associated with the management of patients with chronic disorders.

Medication Incident

Levothyroxine was prescribed for a young adult with hypothyroidism. She took this medication once daily for at least 4 years before her death. Abnormal results on laboratory tests conducted 3 years before her death suggested that the levothyroxine dose was too high. However, there was no documentation of any follow-up related to these results and no indication that any additional investigations had been ordered. According to available records, it appears that the prescriber authorized refills of the levothyroxine prescription multiple times without seeing the patient and without ordering repeat thyroid function tests.

About 1 month before her death, the patient went to the hospital because of palpitations and shortness of breath. Thyroid function tests at that time yielded results indicative of hyperthyroidism, probably due to an excessive replacement dose of levothyroxine. Additional investigations revealed evidence of heart damage. The patient later experienced cardiac arrest and could not be resuscitated. Post-mortem

investigations suggested that excessive levothyroxine therapy over a prolonged period may have contributed to the development of cardiomyopathy, which in turn led to her death.

Background

Monitoring of the level of thyroid-stimulating hormone (TSH) in the blood is required to ensure that the replacement dose of levothyroxine is correct.[4] Guidelines recommend checking TSH levels in the blood 4–8 weeks after initiation of therapy and after every dose adjustment.[2] Once the TSH level is stable and within normal limits, additional testing every 12 months is considered acceptable.[2,4,5] If testing reveals an abnormal result, then more frequent monitoring is recommended, together with medication dose adjustments, as needed, until the TSH stabilizes in the normal range.[5]

Hyperthyroidism is a condition reflecting excessive thyroid activity. Although hyperthyroidism can be caused by a number of diseases, it is commonly the result of an excessive dose of replacement thyroid hormone.[2] Persistent hyperthyroidism can cause atrial fibrillation,[3,6] heart damage,[7] and dilated cardiomyopathy.[7] Proper monitoring of the levels of TSH and other thyroid hormones, coupled with appropriate clinical assessment and suitable dose adjustments, is necessary to ensure safe patient care.

Discussion

This case highlights that follow-up and laboratory monitoring are critical for patients who are taking prescription medications over the long term. For undetermined reasons, there was a lack of follow-up for this patient, even though test results, both from 3 years before her death and at the time of hospital admission, suggested that she had had hyperthyroidism for some time. Initial titration of the levothyroxine dose and regular monitoring could potentially have prevented the heart damage and her untimely death.

Multiple factors must be considered to minimize the risk of harm when patients are treated for conditions requiring long-term medications. These factors can be related to the individual patient, to the practitioner, or to the communication of information (Table 1).

Table 1. Risk factors for harm related to long-term medications

FACTOR TYPE: **Patient-related**
SPECIFIC RISK FACTOR:
• Financial and transportation concerns[8] • Presence of comorbid conditions (e.g., mental health)[9,10] • Difficulty in navigating a complex medical system • Medication nonadherence
FACTOR TYPE: Practitioner-related
SPECIFIC RISK FACTOR:
• Time and workload constraints: - may prevent monitoring for adherence with prescribed therapy[11] - may negatively affect the care of patients with chronic medical conditions[12]
FACTOR TYPE: Communication failures
SPECIFIC RISK FACTOR:
• Ineffective communication among a patient's multiple care providers:[13,14] - missed reports of laboratory results - poor documentation • Lack of documentation by the primary care physician regarding required follow-up

Recommendations

Conversations with patients about their medications can be initiated with "5 Questions to Ask about Your Medications", a tool that was developed collaboratively by patients and healthcare professionals (https://www.ismp-canada.org/medrec/5questions.htm). Effective communication and joint decision-making can improve patients' adherence to treatment plans and their overall health outcomes.[15,16]

The following recommendations are suggested to improve the monitoring of, and communication with, patients who are taking medications for chronic conditions.

Prescribers, Primary Care Providers and Community Clinics/Practice Groups

- Develop standardized processes, for the receipt, management and communication, of test results, to ensure appropriate follow-up for patients who are taking medications for chronic conditions.[14] The development of such processes includes defining roles and ensuring that test results are not filed in the patient's chart until an appropriate practitioner has reviewed them.
- Educate patients who are taking medications that require monitoring (e.g., blood work, radiography) about the reasons for and importance of follow-up appointments.
- Support laboratory monitoring by identifying patients with risk factors for nonadherence:
  - Consider outreach through phone calls or email to those who might benefit from a follow-up reminder (e.g., older patients and those with mental health concerns).
  - Discuss options such as in-home laboratory services with patients who might find it difficult to travel to laboratories or clinics.
- For those using electronic medical record (EMR) systems, advocate for software vendors to incorporate helpful features such as the following:
  - an appointment scheduler to automatically schedule appointments for patients with certain chronic medical conditions
  - on-screen alerts about required monitoring parameters, triggered when specific medication prescriptions or renewals are charted
  - methods for identifying patients whose laboratory assessments are overdue
  - functionality to generate laboratory requisitions and transmit them electronically to the patient's facility of choice
  - functionality to receive laboratory results electronically
- Develop clinic/practice group protocols, based on professional guidelines, that outline considerations when authorizing prescription refills, especially for medications for chronic medical conditions. Such protocols might include the following actions:
  - Conduct periodic reassessments to identify changes in the patient's condition.
  - Determine whether the medication and its dosage are still appropriate.
  - Monitor for new side effects, drug interactions, and contraindications.
  - Evaluate whether the frequency of refill requests is appropriate and safe.
  - Prescribe only enough medication to last until the next assessment is due.

Community Pharmacists

- When patients start new drug therapy for a chronic medical condition:
  - Provide both written and verbal drug information about symptoms that may indicate over- or under-dosing of the medication and recommend follow-up with the primary care provider if those symptoms appear. Highlight symptoms that require medical attention or a visit to the emergency department.
  - Educate patients about the importance of lifelong follow-up appointments and, if they are taking prescribed medications that require therapeutic monitoring, the importance of ensuring that this monitoring takes place. Include discussion about recommended intervals for monitoring, and ask whether the next appointment has been scheduled.
- When patients are refilling medications for a chronic medical condition:
  - Review monitoring parameters (e.g., side effects and symptom control) and address any concerns.
  - Ask patients when they were last assessed or monitored by the prescriber. If the interval is longer than recommended for that medication, contact the prescriber to determine whether the patient should undergo reassessment or laboratory testing before continuing the medication.
  - Review the appropriateness of refill authorization requests before faxing them to the prescriber. Ensure that automated processes such as telephone dial-in services and electronic requests (by email or through a website) do not bypass this step.
  - Ask for an original prescription at appropriate intervals, to support regular follow-up with the physician.
- Lobby jurisdictional pharmacy advocacy groups to seek integration with and access to central laboratory databases. Such integration allows

community pharmacists to view results, ensure that required monitoring is taking place, and identify patients whose results suggest the need for dose adjustments. This access requires that the pharmacist's roles and responsibilities be defined.

Medical Laboratory Testing Facilities

- Ensure that laboratory reporting systems are compatible and fully integrated with the EMRs of local healthcare providers, to facilitate automatic, accurate, and timely transmission of patients' laboratory values.
- Develop centralized, secure online portals for posting the results of laboratory tests, if not already available. These websites should be accessible to both healthcare practitioners and patients. Abnormal results should be distinctly highlighted.
- Establish protocols to communicate abnormal critical test results in a timely manner to the ordering or designated practitioner.

Conclusion

The case described here illustrates how lack of monitoring for a patient with a chronic condition can lead to harm, including death. It is essential that practitioners consider the circumstances that may contribute to failures in a system that is designed and intended to ensure patient well-being. In addition to highlighting barriers to the care of patients with chronic medical conditions, this bulletin suggests improvements to both the healthcare system and individual practitioners' practices.

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Injectable Compounded Product *Label Design for Safety*

Label content and design have been identified as contributing factors to numerous medication incidents. It is crucial to consider the intended use of the product and the needs of the end user when designing product labels.

ISMP Canada has developed the following checklists for the safe labelling of injectable compounded products:

- a general checklist (for injectable compounded products)
- an epidural checklist (specific to epidural medications)
- an intravenous opioid checklist (specific to intravenous opioid medications)

ISMP Canada is seeking consultation from compounded product providers including manufacturers and commercial compounders, and community pharmacy and hospital compounders, as well as any other interested stakeholders.

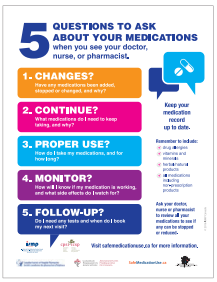
Please provide your feedback!
(https://www.ismp-canada.org/CompoundLabelling/feedback.htm)

We appreciate your participation in this consultation, and look forward to your input by ***Friday, March 24th, 2017***.

YOUR FEEDBACK IS REQUESTED

Your Opinion Matters!

We would like to invite you to participate in a short survey about your experience using *5 Questions to Ask about your Medications* developed collaboratively by Canadian Patient Safety Institute, Patients for Patient Safety Canada, Canadian Society of Hospital Pharmacists, Canadian Pharmacists Association and the Institute for Safe Medication Practices Canada. Your input will be used to help us continue to improve medication safety resources for patients.



This survey will take less than 5 minutes to complete.
Thank you for your participation.

Take the Survey

(http://survey.patientsafetyinstitute.ca/n/5qstoaskforpatients.aspx)

If you have any further questions, please contact us at: medrec@ismp-canada.org

CMIRPS SCDPIM
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The Canadian Medication Incident Reporting and Prevention System (CMIRPS) is a collaborative pan-Canadian program of Health Canada, the Canadian Institute for Health Information (CIHI), the Institute for Safe Medication Practices Canada (ISMP Canada) and the Canadian Patient Safety Institute (CPSI). The goal of CMIRPS is to reduce and prevent harmful medication incidents in Canada.

HIROC

The Healthcare Insurance Reciprocal of Canada (HIROC) provides support for the bulletin and is a member owned expert provider of professional and general liability coverage and risk management support.

ISMP CANADA

The Institute for Safe Medication Practices Canada (ISMP Canada) is an independent national not-for-profit organization committed to the advancement of medication safety in all healthcare settings. ISMP Canada's mandate includes analyzing medication incidents, making recommendations for the prevention of harmful medication incidents, and facilitating quality improvement initiatives.

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(Including near misses)

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