Poor awareness of linezolid’s side effects and monitoring requirements led clinicians at Imperial College Healthcare NHS Trust to develop a linezolid information pack for doctors and patients

Improving linezolid information for patients and the healthcare team

By Mark Gilchrist, MSc, MRPharmS

Healthcare-associated infections caused by meticillin-resistant Staphylococcus aureus (MRSA) can increase patient morbidity and reduce quality of life. They also lead to prolonged hospital stays and represent a financial burden on the NHS (see adjacent Box).

Linezolid can be a useful option for the treatment of MRSA — primarily because it is given orally, which may allow patients to be discharged earlier. Furthermore, dose adjustments for renal impairment are not required and the same dose is given by the intravenous and oral routes, minimising confusion. However, the side effects of linezolid are wide-ranging and can cause serious harm if not detected. Examples include myelosuppression (particularly thrombocytopenia), neuropathies (peripheral and optic) and raised blood pressure due to food-drug interactions. As a result, the manufacturer advises close monitoring of patients taking linezolid and the medicine can only be prescribed in secondary care. Most clinicians, pharmacists and nurses are aware of the side effects of first-line anti-MRSA therapies (eg, glycopeptides causing renal dysfunction and rifampicin and fusidic acid causing liver dysfunction). However, because linezolid is a newer medicine and it is prescribed less frequently, its side effect profile is generally not as well known. As a result, patients may not be monitored appropriately or counselled thoroughly on the side effects.

With linezolid being prescribed more widely for inpatients and on discharge, infection specialists within Imperial College Healthcare NHS Trust (ICHNT) took steps to increase awareness of the monitoring and side effects of linezolid among prescribers — within the hospital and in primary care — and their patients.

Improving awareness

When linezolid was first licensed in the UK in 2001, the Hammersmith Hospitals NHS Trust (now part of ICHNT) “antibiotic review group” (ARG) decided that the drug would be a restricted antimicrobial and that prescribing linezolid would require approval by the infectious diseases or microbiology teams.

At that time, the ARG also produced a “linezolid memo”, which outlined the need to monitor patients’ platelets and be aware of interactions with drugs (specifically selective serotonin reuptake inhibitors) and foods that are high in...
tyramine. This memo was issued whenever linezolid was dispensed from the hospital pharmacy and placed inside the patient’s medical notes by the pharmacist or prescribing doctor. The aim of the memo was to act as a reminder for the medical team on what they should monitor and as a prompt for them to discuss these with the patient. The linezolid memo worked, in part, to raise awareness but had limitations — often because it was filed in wrong section of the medical notes or misplaced.

Following further discussion by the ARG, it was decided to create a patient-friendly leaflet about linezolid together with a pre-printed sticker for the medical notes. Both contained key messages regarding linezolid’s monitoring requirements and were delivered to patients and placed in the medical notes, respectively, by the ward pharmacist. These methods of communication were more effective than the original memo — the information was succinct and easy to understand and the prescribers became more familiar with linezolid monitoring following the introduction of the stickers.

Despite the relative increase in awareness of linezolid’s side effects among prescribers and patients in hospital, it became apparent that this was not the case for discharged patients. Patients who were discharged from hospital and managed as outpatients often struggled to recall specific information regarding their linezolid treatment and side effects. Therefore, side effects sometimes went unreported.

In 2008, the National Patient Safety Agency launched new warfarin guidance which led to a revision of the old warfarin “yellow book” into a new anticoagulant patient pack. The pack contained the same anticoagulant information as the previous yellow book (split into two parts: an information booklet and a drug record booklet) and a credit card-sized anticoagulant alert card for patients to keep on their person.

Recognising the potential benefits of the new NPSA anticoagulant pack, a multidisciplinary group of healthcare professionals at ICHNT discussed the concept with patients and agreed that a similar pack for linezolid should be produced. Prototypes of the new pack were developed and then reviewed with specific input from designers and patient information co-ordinators. Funding for the development of the toolkit was supported via an educational grant from Pfizer (Pharmacia).

**Linezolid pack**
The linezolid pack (see Figure 1) has five main elements contained within an A5-sized wallet, as described below:

**Patient alert card** A credit card-sized patient alert card (see Figure 2, p60) has been designed for patients to carry in their wallets, which is then used to inform other healthcare professionals that they are taking linezolid. Patients are asked to show this to healthcare professionals, for example in accident and emergency departments, at clinic appointments or when they see their GP, dentist, pharmacist or nurse.

**Patient information leaflet** A patient information leaflet has been designed with the help of the patient information co-ordinators within the trust. It aims to inform patients of the key linezolid side effects. It highlights the need for patients to seek advice for unexplained bruising, numbness in the hands or feet, or changes in vision. The leaflet also explains that weekly blood tests are required, but that this is normal while being treated with linezolid.

**Patient record book** A patient record book complements the content in the patient information leaflet but focuses on the weekly blood monitoring. There is an area for patients to record their blood results together with some explanation of what is being measured. It is designed to be
carried by patients for them to show healthcare professionals if required.

Prescriber information leaflet
An information leaflet has been designed to inform prescribers of the monitoring requirements of linezolid. It explains that the drug cannot be prescribed in primary care and that a maximum of two weeks’ supply at a time will be issued from the main hospital pharmacy.

Prescriber “reminder” sticker
An updated version of the prescriber “reminder” sticker was developed. Because of the positive response from prescribers to the original sticker, we used a similar format to the original but adapted it to reflect the key information described in the prescriber information leaflet. The sticker is designed to be placed in patients’ medical notes as a memory aid (see Figure 3).

Future plans
It is hoped that the new linezolid pack will help raise awareness, maintain safety and educate healthcare professionals and patients. The packs have been made available through the ward pharmacy service. We plan to evaluate the impact of the packs on the monitoring of linezolid and gain user feedback to continually develop this toolkit.

In the future we may see linezolid patient monitoring made part of the “outpatient parenteral antimicrobial therapy” service, the development of linezolid outpatient clinics (similar to warfarin INR clinics) or perhaps the creation of a national linezolid monitoring service. The linezolid pack is a tool that would complement such strategies and help NHS organisations safely monitor patients prescribed linezolid.

By making information on linezolid monitoring and side effects available in a variety of forms and empowering patients to take responsibility for their care, we hope that awareness of linezolid safety issues will be better established among patients and prescribers. Like warfarin, linezolid is effective and safe but only if monitored and handled appropriately.

Resources
For further information or copies of the linezolid pack email mark.gilchrist@imperial.nhs.uk.

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References