Subcutaneous drug delivery device

Country of origin | United Kingdom

Health problem addressed
Non-adherence to treatment is considered a major cause of inadequate tuberculosis (TB) treatment by the WHO. The problem of drug resistance arises from patients not completing the treatment course. There is a huge need felt for an assured way of increasing compliance; this will reduce the number of patients developing resistance and improve tuberculosis control programmes.

Product description
The need to enforce therapeutic compliance is addressed by creating a drug delivery system that can release the appropriate therapy over the full treatment period. The subdermal delivery system will release the proper drugs at a controlled rate, assuring proper treatment of affected patients at a target cost competitive with current treatment costs.

Product functionality
The multi-drug reservoir will contain the TB drugs arranged in the appropriate monthly dosage regimen for the treatment of tuberculosis. The implantable system will contain TB drugs encapsulated into responsive nanoparticles, which in turn release the TB drugs into the circulation in a continuous and controlled manner.

Developer’s claims of product benefits
There exists no foolproof solution for assuring patient compliance. Without proper compliance to TB treatment there is increasing development of resistant TB strains. Multi-drug therapy for TB typically consists of two phases: the intensive phase, which is the first 2 months of treatment, and the continuation phase, which is the following 4 months. Our product will be targeted at the latter 4 months when lower and sustained drug doses are needed.

The technology is based on encapsulating the TB drug Isoniazid (INH) in a biodegradable polymeric matrix with slow drug release. We plan for the device to be biocompatible and biodegradable with compartments in a polymeric-based implant to release the drug in a sustained and controlled manor.

Operating steps
A local anaesthetic (2% xylocaine) may be injected in the area just before inserting the device to make it pain free. For the insertion of the device, the local health worker/nurse previously involved in delivering the TB drugs can be trained to insert the device. Designs are in process to make removal rapid with no complications.

Development stage
The product is in an early stage of the development process.

Future work and challenges
As an early stage concept, the biggest barrier we face is introducing a concept into developing countries and professionally training healthcare workers for inserting the device. We also believe that some education will be required to communicate the benefits of a subdermal drug delivery device versus the traditional oral medication to patients.

Use and maintenance
User: Nurse, physician
Training: 2-3 hour training session with demonstration.
Maintenance: Nurse, physician

Environment of use
Setting: Ambulatory, primary and secondary health care facilities in rural and urban settings.
Requirements: Access to a professionally trained healthcare provider.

Product specifications
Other features: Single-use
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