

PROJECT OUTLINE

This research aims to improve information available on the stability and compatibility of combinations of medications delivered by syringe driver in palliative care in the ACT.

The project goal is to create a guideline document and database, relevant to Australian practice and the Australian pharmacopoeia, based on quantitative laboratory and clinical evidence.

This guideline document and database is expected to improve the quality of medication use and thereby improve patient care in palliative care in the ACT and Australia.

Current guidelines for the use of multiple medication combinations do exist and are widely used; however most of the data on which they rely is based on obvious visible changes when medications are combined, such as colour changes, cloudiness or precipitation of solids.

Whilst currently accepted practice, this does not account for many stability and compatibility issues which are not visible to the naked eye, or which do not lead to obvious adverse drug reactions (ADRs).

Previous studies and anecdotal clinical evidence suggests that a proportion of ADRs or treatment failures in palliative care are a consequence of unidentified stability and compatibility issues.

This research aims to answer the questions:

- Are there unidentified stability and compatibility issues which exist amongst current or future combinations of medications delivered by syringe driver in palliative care?
- If yes, do these have clinical consequences?

This information will be gathered in several arms of research:

Arm 1 - Laboratory:

Laboratory based investigations will gather stability and compatibility data of combinations used in palliative care.

This arm will document and validate suitable methodologies for testing these combinations. A selection of combinations has been identified in a previous Quality Project at Clare Holland House.

Analytical techniques will include high performance liquid chromatography, spectrophotometry and turbidity testing. Incubation at various temperatures (37 and 25 degrees Celsius) for 24-48 hours in authentic delivery devices will provide information relevant to the clinical conditions in which these medications are used and also reveal any medication/device incompatibilities. Arms 2 and 3 will reveal further combinations for inclusion in Arm 1.

Arm 2 - Clinical:

Clinical review of medical records of past patients of Clare Holland House will be undertaken. This will focus on identifying and mapping medication combinations delivered by syringe driver and any clinical issues which may have occurred as a consequence of syringe driver use.

Arm 3 - Questionnaire:

Health care professionals involved in palliative care will be asked by questionnaire to identify any anecdotal evidence of issues with medication combinations, any combinations not revealed in Arms 1 and 2, and to identify a "wish list" of as-yet unused/untested combinations. This is intended to allow testing of novel combinations and new medications as and when they arise in clinical practice

Several activities in Arms 2 and 3 having been undertaken in the past 12 months. These have identified the most common medication combinations and dose ranges used in the ACT, and a "wish list" from around Australia.

Arm 1 is the current focus of this project, with current activity developing and validating the analytical protocols to be used.

PROJECT PURPOSE

Patients receiving palliative care commonly have multiple symptoms, including pain, restlessness, dyspnea, itching, anorexia, nausea, constipation, dry mouth, delirium, depression and anxiety (Good et al 2006). Effective management of these symptoms often require administration of multiple medications (Dickman and Littlewood 2000).

Syringe drivers are frequently used in palliative care to avoid the oral route (Gomez 2000), to allow continuous administration of medications, and to reduce medical staff intervention due to their 24 hour duration. They are portable, allowing home based palliative care, and provide ambulatory patients freedom of movement.

Syringe drivers are used to administer combinations of multiple medications tailored to the patient's specific needs. Protocols and guidelines exist for combinations of up to 5 different medications; however combinations of 2 or 3 medications are more usual (Dickman and Littlewood 2000, Dickman et al 2005).

Existing syringe driver guidelines include information on the stability and compatibility of medications when combined together –physicochemical incompatibilities of medications can lead to toxicity and/or treatment failure. The unique environment in which they are used adds further complexity, with the duration (24 hours), the temperature (possibly body temperature or above if syringe drivers are near a person or under bedding) and exposure to light increasing the likelihood of chemical reactions between combined medications. Incompatibilities between medications and plastics have also been observed (Dickman and Littlewood 2000, Dickman et al 2005).

The majority of data in existing guidelines relies on qualitative observation. The observance of colour change, cloudiness, precipitation of solids or crystallisation is seen as evidence of incompatibility. This is indeed true, however does not take into account chemical reactions which are not visible to the naked eye.

Good et al (2004) confirmed that some combinations deemed to be compatible by visual methods in fact showed considerable decrease in medication concentration over time when measured by laboratory methods. The conclusion by these authors is that observational studies are not a reliable basis for determining the stability of medication combinations.

Schrijvers *et al* (1998) note that research into medications in terminally ill patients is rare. This is supported by Wilcock et al (2006) who reported that suitable laboratory based stability data only exists for about half of the medication combinations they studied in regular use in the UK. The Australian pharmacopeia has differences to that of the UK and USA, further limiting the utility of existing guidelines.

References cited.

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