VCACI

The HITH Review

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contents

Victorian Centre for Ambulatory Care Innovation (VCACI)
The Alfred
Commercial Road, Prahran, Victoria 3181

Telephone: (03) 9276 3535
Fax: (03) 9276 6901
Email: vcaci@alfred.org.au
Website: http://vcaci.health.vic.gov.au

This twelfth issue coincides with the 3rd anniversary of The HITH Review. There are several interesting articles on management of infectious diseases and antibiotics used in HITH as well a review of inotrope infusions in heart failure and self-administration. Publications listed include a review of Emergency Department presentations with anaphylaxis from a Brisbane hospital, one study that used insurance claims data to assess the cost of intravenous vancomycin home care therapy for gram-positive infections and several publications on parenteral nutrition.

Most of the articles listed in this review are available from libraries in Australia with some available from journal websites. Copies of articles with an asterisk (✯) required for educational or research purposes can be requested from VCACI when they are not available from your library. An order form is available on our website.

We appreciate receiving your feedback on The HITH Review and would particularly welcome any contributions. Please contact us if you wish to be included on our mailing list. The HITH Review is available free of charge in hard copy from the VCACI or can be accessed on the VCACI Web page. Those preferring to receive The HITH Review in electronic format should forward their E-mail address to us.

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Once Daily Cefazolin for Cellulitis

Alexander Padiglione

Grayson ML, McDonald M, Gibson K, Athan E, Munckhof WJ, Paull P, Chambers F. *Once-daily intravenous cefazolin plus oral probenecid is equivalent to once-daily intravenous ceftriaxone plus oral placebo for the treatment of moderate-to-severe cellulitis in adults*. Clin Infect Dis 2002; 34:1440-8. ☆

A once-daily regimen of cefazolin (2 g intravenously {iv}) plus probenecid (1 g by mouth) was compared with ceftriaxone (1 g iv) in a randomised, double-blind equivalence trial of home-based therapy for moderate-to-severe cellulitis in 93 adults. Clinical cure occurred at the end of treatment in 86% and 96% of assessable patients respectively (p=0.11), and was maintained at 1 month of follow-up in 96% and 91% (p=0.55), respectively. The mean number of treatment doses given was similar in the 2 treatment arms (6.97 + 2.6 for cefazolin-probenecid and 6.12 + 2.1 for ceftriaxone-placebo; P=0.06). Patients in the cefazolin-probenecid arm had considerably more nausea.

comment

Cellulitis is the single commonest indication for HITH treatment for most programs in Australia. Most cases are caused by staphylococci or streptococci. Unfortunately, the best antibiotics for these organisms are penicillins or first generation cephalosporins, which are rapidly renally excreted and therefore need frequent dosing. Because staff time is the major cost for many programs, some units use unnecessarily broad (e.g. ceftriaxone or vancomycin) treatment simply for the convenience of a once a day dosing schedule.

These authors have previously shown that twice daily (bd) cephazolin is safe and effective in a non-comparative observational study, and this has become the standard of care in many units. They further that work by showing that daily cephazolin+oral probenecid is equivalent to ceftriaxone, and offer it as a "cheap, practical, and effective treatment option for moderate-to-severe cellulitis". An earlier study by Brown et al[1], published in 1996, showed similar findings, albeit with a slightly different study design and more diverse patient group.

Cost savings over ceftriaxone are likely to be minimal since the price of the latter has dropped markedly in recent years as it came off patent. Hence the major advantage of these findings would be that it obviates the need for a broader agent such as ceftriaxone or vancomycin simply for convenience.

The major problem with the study is that they chose as a comparator a regime that is relatively infrequently used (we hope!) for cellulitis in this country, many units having already switched to bd cephazolin. A direct comparison with bd cephazolin would have been more relevant in the Australian context, though it is reassuring to note that the level of response seen with once daily cephazolin + probenecid in this study was comparable to the "historical" cure rate of 88% seen in the bd cephazolin study. The other factor that will limit the uptake is the high rate of nausea and vomiting (16%) seen with the probenecid. But perhaps the biggest challenge will come from technical innovations that allow us to give more frequent dosing or continuous infusions of "older antibiotics" with only daily attendance by nursing staff. Daily cephazolin therapy may well be a treatment option that is outdated before it becomes established.

1. Brown, G., et al., *Ceftriaxone versus cefazolin with probenecid for severe skin and soft tissue infections.* J Emerg Med, 1996. 14:547-51.

Evaluation of Vancomycin in HITH – from the US Outcomes Registry

Alex Padiglione

Tice AD, Hoaglund P A, Nolet B, McKinnon PS, Mozaffari E. *Cost perspectives for outpatient intravenous antimicrobial therapy.* Pharmacotherapy 2002; 22:63S-70S. ☆

The United States Outpatient Parenteral Antibiotic Therapy (OPAT) Outcomes Registry was used to quantify the indications, costs and adverse events related to home intravenous vancomycin therapy. Most courses were given for sensitive *Staphylococcal* infections (42.7%), followed by MRSA (30.1%), Coagulase-negative staphylococcus (18.6%) and *Enterococci* (8.1%).

They found that the cost of outpatient therapy was substantial, but varied widely across different health care providers, with not unexpectedly the lowest costs in the government sponsored schemes, intermediate costs under the "managed care" organisations, and greatest costs under the privately insured systems. Vancomycin therapy had to be ceased in 11% of patients, about two thirds of which were for drug toxicity. The authors suggest that alternative outpatient therapies associated with lower risks for adverse events and lower costs should be considered.

comment

Around 250,000 patients are treated with intravenous antibiotics on HITH each year in the US. There is often a patient preference for this type of care. These authors chose to examine this system by focusing on one common drug, vancomycin, from both a cost and toxicity perspective. They show that home care with intravenous vancomycin entails considerable cost and complexity, and is associated with significant adverse reactions. However they determined costs by looking at reimbursements made by various types of "insurers" (Government, MCO's and private insurers) rather than calculating true costs. In addition they do not provide any direct comparisons with inpatient care.

The level of adverse reactions they describe is consistent with earlier studies in inpatients. They do not provide sufficient data to evaluate the reasons for the choice of vancomycin as therapy, particularly as the majority of patients were treated for methicillin-sensitive staphylococcal infections. How many had penicillin allergy? In how many was it used for convenience?

The paper is valuable because it stresses that HITH is not cheap (though it may be cheaper than the alternative) and is associated with significant adverse effects. We need to carefully assess patients taken onto the program and the treatments we give them, in particular we should not be seduced by convenience or easy availability from consideration of other treatment modalities, including oral treatments.

Management of Infectious Diseases in HITH – an Australian Review

Alex Padiglione

Howden BJ, Grayson, ML. *HITH treatment of infectious disease*. Med J Aust 2002; 176: 440-5. ✯

Infectious diseases are one of the major indications for HITH. Cellulitis, pyelonephritis, pneumonia, endocarditis, osteomyelitis, septic arthritis and deep abscesses can all be safely and effectively treated at home. Careful selection of patient, antibiotic and delivery system, together with regular patient review, are the keys to running a successful service. Innovative dosing regimens (once-a-day aminoglycosides, continuous infusion b-lactams, and once or twice-a-day cephalosporins) expand the range of infections that can be effectively treated as outpatients.

comment

In this excellent review the authors summarise the current situation in Australia, with an overview of selection of patient, intravenous access and administration devices, as well as antibiotic choice. In addition they provide a useful overview of suggested treatment regimens for the most common infections referred to HITH programs.

Directed primarily at a general practitioner audience, it succinctly sums up the current state of play in a very user-friendly style with helpful charts and tables. It would be a useful read for any new staff coming into the area. I imagine the table on suggested drug regimens for common conditions will find its way onto many noticeboards in units around the country.

Infective Endocarditis

Alex Padiglione

Andrews MM, von Reyn CF. *Patient selection criteria and management guidelines for outpatient parenteral antibiotic therapy for native valve infective endocarditis.* Clin Infect Dis 2001; 33:203-9. ✯

Infective endocarditis (IE) is increasingly being treated on an outpatient basis, despite the absence of controlled data showing equivalent with standard inpatient care. The authors review existing HITH guidelines, published data on the timing of complications from IE, and data on risk factors that can be used to predict complications. They note the paucity of data available in this area. They then propose more stringent criteria for patient selection and clinical management of native valve IE on HITH. A key recommendation is to follow a very conservative approach (inpatient or daily outpatient follow-up) during the critical first 2 weeks of treatment when complications are most likely.

comment

Intuitively we know that careful patient selection is the key to running a successful HITH program. But this "viewpoint" article addresses the issue of "how careful is careful enough?"

The expansion of HITH programs is largely driven by economics, inevitably accompanied by the mantra of "patient preference". More and more conditions are treated under the HITH model, yet the evidence that outcomes are comparable to inpatient care is lacking for many diseases. Clinical practice often runs ahead of the science, however "standard" practice may not necessarily be best practice. Initial highly positive reports of successful HITH treatment need to be reassessed in the cold hard light of day to see whether these outcomes are achieved in real life settings under less controlled and selective conditions. These authors have done just that for a specific, relatively uncommon but important condition. The review was prompted after 2 deaths ultimately resulted in patients with IE treated by their program.

They express the view that for a serious condition like IE, we should adopt new treatment modalities cautiously, only relaxing our selection criteria when there is evidence to do so, and constantly evaluating our outcomes to ensure the quality of the care we provide. Many readers will be surprised by the lack of evidence, in particular randomised trials, on which to base recommendations. We do know that certain causative organisms, patient factors and clinical factors can predict worse outcomes, and the authors succinctly review these. However as not all poor outcomes are predictable, they issue a timely warning about remaining conservative in our selection criteria and surveillance of patients with IE on

National Surveillance of infections in HITH

Kaylene Fiddes

Manangan L, Pearson M, Tokars J, Miller E, Jarvis W. *Feasibility of National Surveillance of Health-Care-Associated Infections in Home Care Settings*. Emerg Infectious Diseases 2002; 8:1-5. ☆

This extensive article could be divided into three components. The first component examines the rationale for a national surveillance system of infections in HITH in the US. The second component discusses the challenges associated with developing a national surveillance system in this setting and thirdly, the feasibility of developing a system is described.

Within the discussion for the rationale for development of an infection surveillance system, previous infection surveillance studies undertaken in the HITH setting in the US are described. These include the Center for Disease Control and Prevention's (CDC) investigation of three bloodstream infection outbreaks in home infusion patients during 1993-1995, which involved needless devices. Also described is a prospective multi site study of home infusion patients, which sought to determine rates of bloodstream infections and risk factors. This study determined that needleless devices were not associated with bloodstream infections and that independent risk factors included recent bone marrow transplant, administration of TPN, the infusion occurring outside the home such as in a clinic or physicians office and use of a multi-lumen access device.

The data from surveys of infections among patients (7,900 patients) of Missouri Home Health agencies conducted by the CDC and Missouri Alliance for Home Care in 1999-2000 are also included in this article. (Please note for further reference, this survey has been reported in the March 2002 edition of the VCACI newsletter under the website section). The data suggests that during the summer, 16% of patients

were reported to have infections: 8% were home acquired and 35% were hospital acquired. During the winter, 16% of patients had infections. The types of infections are included. The authors suggest that since an estimated 1.2 million home care patients in the US have infections annually, a national surveillance system is warranted.

The authors also suggest that whilst a hospital acquired infection surveillance system has been implemented since the 1970s, there is no system or standardised definitions in existence for the HITH setting. It is felt that, as occurred in the hospital setting at the introduction of a national surveillance system, a decrease in infection rates in the HITH setting may result. It is also felt that a national surveillance system would provide data on incidence and types of infections and identify risk factors and benchmarks for the HITH setting.

In examining the development of a national surveillance system the authors felt the following challenges were relevant: Lack of nationally accepted definitions and methods, loss of patient follow-up, lack of trained personnel, difficulty in capturing clinical and laboratory data, and difficulty in obtaining numerator and denominator data.

The article notes several organisations that are collecting infection data in the HITH setting including OPAT. The authors call for a national system for surveillance, which would also facilitate the monitoring of the impact on interventions used to prevent infections occurring in the HITH setting.

comment

The data presented in previous infection surveillance studies are interesting and the authors make strong arguments for the development of a system. The article does not include the potential costs or costs benefits associated with implementing a surveillance system nor the potential resources involved in collecting and reporting the data. The article does not discuss infection rates in the hospital setting in comparison to the home setting. With an anticipated increase in HITH use however such a system will provide powerful information for the prevention of infections in this setting and therefore could be a useful quality improvement tool.

Inotrope Infusions in Heart Failure

Lisa Demos

Gorski LA. *Positive inotropic drug infusions for patients with heart failure: current contoversies and best practice.* Home Healthcare Nurse 2002; 20: 244-53. ✯

comment

This US article provides a good overview of inotrope (dobutamine, milrinone) infusions in the home or outpatient setting. It discusses the controversies surrounding intermittent and continuous long-term use for advanced, end-stage heart failure. The article discusses the drugs used including side-effects, pharmacokinetics, dosage and administration and mechanism of action. The importance of patient selection is stressed for patient safety and includes clinically stable patients at discharge, a patient willing and motivated to learn self-administration and the availability of a caregiver during the infusion. The article also covers patient education and includes cardiac parameters that should be monitored with each home visit.

HITH and the Older Patient

Kaylene Fiddes

Leff B. *The Home Hospital: An Alternative for Older Patients?* Hospital Practice 2001; 36:11-16. ✯

This brief editorial article examines the potential for utilising HITH with geriatric patients in the US based on the experiences of Australian and UK studies. The author, an Associate Professor of Medicine at Johns Hopkins University School of Medicine, suggests that such studies should be tested in their healthcare environment. A summary of recent studies for HITH for older patients including Dr Gideon Caplan and co-workers (Prince of Wales) study is provided. The studies reviewed by the author suggest that for appropriate older patients, HITH is an effective and acceptable alternative to a hospital bed with no differences in adverse events. In addition to the published studies described, the author's small pilot study of HITH for 17 older patients is discussed with favourable outcomes.

comment

The most relevant part of this editorial to HITH Review readers is the succinct summary of recent studies of HITH for older patients. This article is an editorial and therefore only briefly examines some of the studies conducted in HITH. The study summary may be useful however for those requiring information including study outcomes to develop HITH programs in geriatrics.

Appropriateness of Hospital Stay Instrument

Nick Santamaria

Panis LJF, Verheggen FWSM, Pop P. *To stay or not to stay. The assessment of appropriate hospital stay. A Dutch report.* International J Quality in Health Care 2001. 14: 55-67. ✯

This paper describes the modification of the Appropriateness Evaluation Protocol (AEP) US Version into a Dutch version of the instrument. The developmental process undertaken is described including validity and reliability testing. A total of 4500 bed days were assessed in a large Dutch University hospital. Results suggest that the Dutch version (D-AEP) identified 20% of patient days assessed were inappropriate. The D-AEP was found to be valid, reliable and easy to use. The study identified a range of internal and external factors responsible for inappropriate hospital stay.

comment

The authors have demonstrated that the AEP can be successfully modified to suite local conditions. The need to modify acuity measurement instruments to increase validity highlights the difficulty in specifying *a priori* acuity criteria across continents and cultures. Of particular interest is the identification of a range of factors that contributed to a large number of inappropriate bed days. Of these factors, many would be familiar to Australian readers. The unavailability of more appropriate care facilities, delays in discharge procedures, lack of primary care were among the frequent causes of unnecessary hospitalisation. The study is also useful because the authors investigated specific specialty areas, which provided interesting differences between specialties. Overall the study demonstrates the difficulty of developing objective, valid and reliable acuity/ appropriateness assessment instruments whilst highlighting the potential for process improvement at the local level.

Self-Administration

Lisa Demos

Grimes-Holsinger V. *Comparing the effect of a skills checklist on teaching time required to achieve independence in administration of infusion medication.* J Infusion Nursing 2002; 25:109-20. ✯

comment

This US article evaluates a standardised skills checklist and a standardised instruction sheet that is used by nurses to reduce the time required for a patient to be independent with antibiotic administration. The impact of using the standardised checklist and instruction tools in 52 patients was compared to a control group of 53 patients receiving instructions from nurses using any method they chose. The patients ranged in age from 14 months to 74 years and the most common indications for antibiotic therapy were infection non-surgical (40%) and cellulitis (21.9%). The most commonly prescribed antibiotics were ceftriaxone (22.9%) and vancomycin (21%). The most common access device was a PICC line (61.9%) with medications administered using gravity devices in 40% of patients, Sabratek pumps in 21% and Bard devices in 18.1%. It is difficult to determine if the patients and patient treatments were similar in both groups however the authors demonstrate that the use of the checklist and instruction tools reduced the number of teaching visits and total instruction time. Although there are limitations to this study it does highlight other benefits of using a checklist including standardising teaching tools, ease of handover between nursing staff and improved documentation.

List of Medline, Cinahl and other relevant published articles

Anaphylaxis

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Hakemi A, Todd K. *The recognition and management of anaphylaxis and anaphylactoid reactions.* Home Health Care Consultant 2002; 9:14-21. ✯

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Grimes-Holsinger V. *Comparing the effect of a skills checklist on teaching time required to achieve independence in administration of infusion medication.* J Infusion Nursing 2002; 25:109-20. ✯

Gunter KS, Matteson S. *A competency-based modular learning program.* Home Healthcare Nurse, 2002; 20:51-5. ✯

Cost Effectiveness

Moriearty PL. *Pursuing cost effective home care through diversification and consolidation.* Home Health Care Consultant 2002. 9: 22-7. ✯

Leff B. *Acute? care at home: the health and cost effects of substituting home care for inpatient acute care: a review of the evidence.* Am J Geriatrics 2001; 49: 1123-5. ✯

Diabetes

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Leff B. *The home hospital: the alternative for older patients.* Hospital Practice (Office Edition) 2001; 36:15-6. ✯

Tinetti ME, Baker D, Gallo WT et al., *Evaluation of restorative care vs usual care for older adults receiving an acute episode of home care.* J Am Med Assoc 2002; 287:2098-2105. ✯

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Gorski LA. *Positive inotropic drug infusions for patients with heart failure: current contoversies and best practice.* Home Healthcare Nurse 2002; 20: 244-53. ✯

Hepatic Lines

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Immunoglobulin

Andrews D. *The expanding use of IVIG: insights into its mechanism of action.* Infusion 2001; 7:28-32. ✯

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Andrews M-M, Von Reyn CF. *Patient selection criteria and management guidelines for outpatient parenteral antibiotic therapy for native valve infective endocarditis.* Clin Infect Dis 2001; 33:203-209. ✯

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Long CO, Anderson C, Greenberg EA, Woomer N. *Defining and Monitoring indwelling catheter-related urinary tract infections.* Home Healthcare Nurse 2002; 20:255-262. ✯

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