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The third edition of The HITH Review includes reviews of two recent articles on hospital-in-the-home from the British Medical Journal, as well as brief summaries of articles on intravenous catheter infections, telemedicine, wound care and Capecitabine, an oral alternative to 5-fluorouracil.

Most of the articles listed in this review are available from libraries in Australia. Some articles are available from journal websites (eg www.bmj.com/ for the British Medical Journal, and www.amapublications.com for JAMA and the Archives journals). Articles specifically on HITH and Ambulatory Care are also listed on the VCACI database available on the website. Medline access is available via the NIH Web site: www.ncbi.nlm.nih.gov/PubMed/.

Articles with an asterisk (*) can be requested from VCACI for educational or research purposes if you are having difficulty obtaining a copy from your library. A charge of \$20 will apply for each article requested.

We would appreciate receiving your feedback on The HITH Review and would welcome any contributions you may wish to share with other practitioners. 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 via the VCACI Web page.

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Randomised Controlled Trial of the Effectiveness of a Hospital at Home Scheme Compared with Hospital Care.

Christopher Fairley

Wilson A, Parker H, Wynn A et al. **Randomised controlled trial of effectiveness of Leicester hospital at home scheme compared with hospital care.** *Br Med J* 1999; 319:1542-6. (www.bmj.com for full text) ★

This randomised controlled trial compared hospital in the home (HITH) care with in hospital care. 199 consecutive patients were randomly allocated to hospital or home care. Six of the 102 patients randomised to HITH and 23 of the 97 allocated to hospital care refused their allocation group. Medical indications suitable for HITH included chest infection, immobility, diarrhoea and vomiting, cerebrovascular accident, falls, urinary tract infection and acute exacerbation of chronic conditions eg Parkinson's disease, multiple sclerosis.

The main outcome measures were health status (Barthel index, sickness impact profile 68, EuroQol, Philadelphia geriatric morale scale) which were assessed at 2 weeks and 3 months after randomisation. Mortality was reported but the authors noted their study had insufficient power to assess this end point precisely.

An intention to treat analysis was undertaken for all analyses. There were no significant differences in the health status or dependency scores between the two groups. The HITH group had a significantly shorter duration of stay than the in-patient group (median 8 days vs 14.5 days, $p=0.03$). The 3 month mortality was similar in both groups, with 26 (25%) deaths in the HITH group and 30 (31%) in the in-patient group (relative risk 0.82 (95% CI 0.52-1.28)).

The authors concluded that HITH care was as effective as hospital care but that HITH care was significantly shorter and therefore likely to be more cost effective.

commentary

This study is welcomed as it is one of the first randomised studies of direct admission to HITH care compared to in-patient care (the first in the UK). The discussion of this paper deals well with the limitations of the study.

The randomised study design provides it with rigour not possible in observational studies. It clearly shows equivalence in the subtle end points assessed. It is however extremely difficult to measure the quality of health care. This is a particular

problem in studies like this, where many different clinical conditions are treated so more robust end points (eg. presence or absence of pulmonary emboli) are not possible. Importantly the authors recognise that the study was too small to accurately assess mortality. They correctly point out in the discussion that the HITH group could have had a 28% higher mortality (upper confidence interval).

Key messages

- HITH care was equivalent in health status and dependency scores to in-patient care.
- HITH care had a significantly shorter duration of care than in-patient care.
- Mortality between the two groups was similar but the study had insufficient power to claim they were equivalent.

Economic Evaluation of Hospital at Home versus Hospital Care

Lisa Demos

Jones J, Wilson A, Parker H et al. **Economic evaluation of hospital at home versus hospital care: cost minimisation analysis of data from randomised controlled trial.** *Br Med J* 1999; 319:1547-1550. (www.bmj.com for full text)

This is a cost minimisation analysis of the HITH scheme at Leicester and hospital care in the city's three acute hospitals (see previous article). Costs included staff inputs, consumables, equipment, overhead costs and capital costs for hospital at home, and length of hospital stay and the specialty or ward for hospitalised patients during the initial episode and three months after admission.

Mean costs per day of care were higher in the HITH arm (£207 versus £134, $p<0.001$). However mean costs per episode were similar by intention to treat analysis: HITH £2569 and hospital ward £2881, bootstrap mean difference -305 (95% CI -1112 to 448). When analysis was restricted to those who accepted their allocation of care, HITH was cheaper at £2557 compared to £3660 for hospital ward care, bootstrap mean difference -1071 (95% CI -1843 to -246). These cost differences were sustained at 3 months.

commentary

Previous economic evaluations of HITH have provided conflicting results. This randomised trial indicates similar costs for HITH and hospital care with HITH being a cheaper alternative when analysis was restricted to patients accepting their allocation of care. Carer and patient expenditure were not included in the analysis however in a previous randomised controlled trial by Shepperd and co-workers (Br Med J 1998; 316:1791-6) they were a small proportion of the total costs and were not different between groups.

Intravenous Catheter Related Infections

Carole Staley

Hanchett, M. **Understanding the Obstacles to Consistent Intravenous Catheter-Related Infection Reporting by Home Health Providers.** *J Intraven Nursing* 1999; 22: 320-4. ★

This article describes the most widely used statistical formulae used for reporting intravenous catheter-related infections, their advantages and disadvantages, and their relevance to the home health setting. The article explores the pitfalls of comparing data where the precision of data collection is variable and where different methods have been used to calculate IV infection rates.

The dilemma encountered when calculating IV infection rates is what figure to use for the denominator of the equation. In the past, the total number of patients or patient days has been used but this number should be narrowed to encompass only those patients at risk of IV catheter infection. Further refinement of the denominator is recommended to enable consideration of individual risk and length of time of individual catheter use. The currently accepted denominator is the total number of device/catheter days, ie the number of days the device is in place. Even so, this number is not always an easy number to capture and still does not take into consideration individual risk or device type. The author recommends that consensus between home health agencies is critical to establish the best measurement for IV infection rates.

commentary

This article is of relevance to Australian HITH programs, which are not collecting this type of data broadly. The article identifies the pitfalls in measuring IV infection rates and provides a good basis for developing a consensus regarding consistent data collection and analysis to support the monitoring of IV catheter related infections.

A large proportion of the article focuses on the barrier of inadequate information systems to support the collection and analysis of IV infection rates which is more relevant to the American HITH system. Even so, this highlights the need to give consideration to the collection of infection related data within the clinical component of a HITH information system.

New oral cytotoxic therapy - Capecitabine

Margaret McKenzie

Mrozek-Orlowski ME, Frye DK, Sanborn HM. **Capecitabine: Nursing Implications of a new Oral Chemotherapeutic Agent.** *Oncol Nursing Forum* 1999; 26:753-762. ★

This article describes the implications for oncology nurses as patients commence capecitabine therapy. It provides a summary of the drug itself, its actions, side effects, the clinical trials and what the education of the patient should involve, including samples of instruction sheets for patients. The article is written from an American perspective so it includes Medicare reimbursement information that is not relevant in the Australian setting.

commentary

Capecitabine is an oral tumour activated form of 5-FU that has recently been approved for administration to patients with metastatic breast cancer. This drug is a self-administered, home based therapy that requires a high level of patient education on aspects from treatment compliance to the timely recognition of side effects.

As this drug has recently been approved for use in Australia, this article provides some timely advice for oncology nurses who come across it in their practice. A patient information kit with a video, an information booklet, question and answers and a diary are available from the pharmaceutical company for patient education.

Recent advances in telemedicine have allowed for greater developments in home based health care. A number of initiatives are being developed, both in Australia and overseas, which allow patients to be monitored from remote locations.

Several studies have demonstrated the cost effectiveness of telemedicine, however, research in this area is insufficient to offer any conclusions regarding the economic benefits of this technology. Particularly in the US managed care environment, where cost cutting is a primary concern, the cost effectiveness of health care is a priority. However, as Michael and Summers (1999) propose, improved quality of life should be the principal motivator for the utilisation of alternative methods of health care.

While the following references offer an extensive review of advances in telemedicine, they fail to provide substantiated evidence for the effectiveness of these technological developments. Telemedicine is a rapidly developing field and these articles site a number of references and websites that have already been superseded. As mentioned in a number of the references, further analysis is required on the cost effectiveness of telemedicine, ethical and legal issues, quality of life measures and patient satisfaction before any conclusions can be offered.

Angaran, D. Telemedicine and telepharmacy: Current status and future implications. AJHP Online 1999; 56:1-28. ★

This article outlines possible uses of telemedicine and the potential role of pharmacy in the telemedicine arena. The potential benefits of telemedicine are described which entail, improved access to care, greater efficiency in diagnosis and treatment, higher productivity and greater market positioning.

The review outlines recent developments in ambulatory care monitoring devices for measuring body weight, blood pressure, heart rate, oxygen saturation and INR, which allow the downloading of information directly into a computer database. The author describes how telepharmacy can assist in monitoring medication compliance through the use

of touch-tone telephone activated intravenous pumps but warns of the economic, regulatory, legal and ethical implications of telemedicine and suggests that further research is needed into the effectiveness, cost, training, standards and social implications of telemedicine.

Vesmarovich, S., Walker, T. et al. Use of telerehabilitation to manage pressure ulcers in persons with spinal cord injuries. Advances in Wound Care 1999; 12:264-9. ★

This article explores the use of telerehabilitation as a viable alternative to weekly patient visits for eight patients with spinal cord injuries and pressure ulcers.

A Picasso Still-Image Videophone was used in the patients' homes to capture and send images of the wound to the clinic. The findings of this study suggest that pressure ulcers can be managed successfully via telerehabilitation. Telerehabilitation allowed a greater frequency of assessment, which in turn may have impacted on healing time due to earlier intervention and prevention. Patient and family satisfaction was extremely favourable as telerehabilitation eliminated transport problems and saved time and money on travelling.

Balas, E. & Iakovidis, J. Distance technologies for patient monitoring. Br Med J 1999; 319:1309. (www.bmj.com for full text) ★

This article provides a review of recent controlled trials of home distance monitoring and an evaluation of currently available technologies.

The authors suggest that emerging technologies are beneficial for monitoring diabetes, blood pressure, paediatric obstructive sleep apnoea syndrome and various other conditions. Alternatively, distance technologies failed to improve outcomes in high-risk pregnancies – blood glucose concentration, uterine activity and foetal heart rate were not significantly different between patients monitored at home, admitted to hospital or receiving nurse visits. This highlights the need for further randomised clinical trials for specific areas of care.

The authors propose that advances in technology allow a continuum of care rather than episode based care and recommend that telemonitoring should extend beyond data collection to gathering feedback, providing preventive care, patient education, screening, assessment and decision support.

Barber, B. Patient education technology hits home. PT – Magazine of Physical Therapy 1999; 7:30-32. ★

This article explores current technological innovations for use by Physical Therapists and their patients.

Physical Therapists indicate that technological innovations, such as, computer-generated printouts, personalised videos and software programs, have resulted in greater efficiency, patients having a feeling of control over their care and an increase in patient understanding of their exercises. Individualised patient exercise programs allow the therapist to choose the sequence, speed and repetition of exercises. It is also suggested that individualised programs may increase compliance due to the increased feeling of control.

Celler, B., Lovell, N. & Chan, D. The potential impact of home telecare on clinical practice. Med J Aust 1999; 171:518-521. ★

The authors suggest that hospital care is more expensive than private nursing home care and that patient outcomes and quality of life are improved when the patient is treated in their own home. They quote several studies that indicate the cost effectiveness of home based telecare improved outcomes, enhanced quality of life and decreased readmission rates. The authors suggest that future controlled trials are necessary to statistically evaluate the effectiveness of home based telecare.

Michael, J. & Summers, C. Telehealth: Are you prepared to avoid the risks? Home Healthcare Consultant 1999; 5:27-32. ★

The authors of this review provide a summary of the benefits and risks associated with home based telehealth. Telehealth includes the basic telephone communication between a nurse and a patient or their family, as well as more advanced options for monitoring vital signs and providing other assessments and increasingly, interactive telehealth visits.

Telehealth is viewed as a more cost-effective option in the delivery of health care and is therefore increasing in the US due the constraints of managed care and cuts in Medicare funding. The authors warn of the danger that third-party payers will use telehealth as merely a method to reduce the cost of health care, possibly resulting in a decrease in the quantity and quality of services.

Major risks, such as confidentiality issues and possible breakdowns in communication, are discussed. The authors explain the process involved in obtaining informed consent and stress the importance of maintaining communication between health care providers. They recommend formulating policies and procedures to address issues of responsibility, accessibility and storing of information.

Wilson, C. The impact of medical technologies on the future of hospitals. Br Med J 1999; 319:1287. ★

This article outlines current advances in technology and the impact that these developments will have on the role and structure of hospitals through the alteration and/or elimination of hospital based care.

Although the author primarily focuses on in-hospital technology and its impact on the efficiency and cost of health care, a number of the technological advances have implications for ambulatory care environments.

Wilson, L., Sharp, I., Gill, R., et al. The Hospital Without Walls – Home Telecare Using Vital Signs Monitoring. 1999. HIC99 Conference, Health Informatics Society of Australia. ★

“Hospital without walls” is a collaborative project between the CSIRO Division of Telecommunications and Industrial Physics and the Ryde Aged Care and Rehabilitation Service which aims to provide patient care in the community setting through telecare.

The project primarily focuses on cardiovascular patients. Patients wear a device that monitors their vital signs and body movement (posture and activity) and transmits this information to a Home Station. Further information about the fall is deduced from patterns of acceleration. The Home Station analyses the information transmitted, to decide whether a response is required. This project is still in the early stages of development but the authors suggest that it already appears that the technology will have a positive influence on the care of patients subject to falls.

Central Venous Access Devices in the Home Setting

Carole Staley

Cole, D. Selection and Management of Central Venous Access Devices in the Home Setting. J Intraven Nursing 1999; 22:315-9. ★

This article identifies that healthcare's transition from hospital to a community-based system has increased the use of Central Venous Access Devices (CVADs) in the home. The article provides guidelines for selection of intravenous access devices and assessment of the patient and carers' ability and readiness to be involved in the management of CVADs at home. The article also outlines strategies for educating the patient and carer in the self-management of CVADs.

When selecting the appropriate intravenous access device, consideration needs to be given to several issues including the type of therapy, duration of the therapy, cost of the device and insertion, and patient choice. Central venous access should be used where the therapy is irritating to vein walls, eg vancomycin, ciprofloxacin, total parenteral nutrition, >10% dextrose solutions and many chemotherapeutic agents. The author recommends intravenous access device selection should be a collaborative effort between the nurse, physician, pharmacist, patient and carers. The patient's choice may be influenced by activity levels, ability to conceal the intravenous access device and comfort. Table 1 summarises the rationale for selection of the various intravenous access devices.

commentary This article provides a useful overview of the rationale for intravenous line selection and strategies for educating the patient, including the patient and carer's ability and readiness to learn, care and maintenance of the device, signs and symptoms of complications and the action to take should a complication arise. It is particularly of value in guiding the development of patient education packages

The author claims patients and their carers are being asked to assume more responsibility in the self-management of CVADs and although this may be more prevalent in the USA, this trend is also occurring in Australia.

Table 1: Rationale for the Selection of Intravenous Access Devices

| DURATION OF THERAPY | < 10 d | > 10 d | 4-6 weeks | > 6 mths | > 12mths |
|---|------------------------------------|------------------------------|-----------|----------|----------|
| Conventional Peripheral Access | Yes | | | | |
| Midline Catheter | If peripheral access difficult | | | | |
| PICC (Peripherally Inserted Central Catheter) | If peripheral access difficult | Yes | Yes | Yes | |
| Conventional non-tunnelled CVAD | If therapy irritating to vein wall | If not a PICC line candidate | | | |
| Tunnelled CVAD | No | No | Yes | Yes | Yes |
| Implanted Port | No | No | No | Yes | Yes |

Wound Care in the Home Setting

Nick Santamaria

Barr, J.E. Integrating disease management and wound care critical pathways in home care. Home Healthcare Nurse 1999; 17:651-63. ★

This article provides an overview of two broad subject areas; disease management and critical pathways. Definitions and background are provided for the two topics followed by an attempt to integrate the two areas specifically for wound care in the home setting. A process for the development of critical pathways is described and an outcomes based wound care critical pathway is provided to highlight points made by the author.

Maklebust, J. Preventing pressure ulcers in home care patients. Home Healthcare Nurse 1999; 17:229-38. ★

Maklebust, J. Treating pressure ulcers in the home. Home Healthcare Nurse 1999; 17: 307-16. ★

These two companion articles provide an overview and guide to the prevention and treatment of pressure ulcers in the home setting. Both contain up to date yet brief reviews of the literature pertaining to the topic areas. A number of assessment and decision support flowcharts are provided that link to the points made by the author.

The article by Barr is useful for those needing a brief introduction to pathway development generally and more specifically to wound care pathways. The section on variance analysis is informative as are the points made regarding the appropriate use of pathways and their suitability to the general population of patients with wounds treated in the home. Being an American article, no distinction is made between HITH and post acute care. Similarly, the reader needs to be cognisant of the vastly different financial reimbursement system in the USA which influences home care initiatives.

The two articles by Makelbust provide a useful guide to pressure ulcer prevention and treatment and contain clear and well-presented prevention and treatment flowcharts. However neither contains new information and they may be of limited use to HITH practitioners due to their broader homecare focus that could be classified as post acute.

Abstracts from Medline and Cinahl

Sachdev GP, Ohlrogge KD, Johnson CL. Review of the Fifth American College of Chest Physicians Consensus Conference on Antithrombotic Therapy: Outpatient management for adults Am J Health-System Pharm 1999; 56: 1505-14. ★

The recommendations of the Fifth American College of Chest Physicians (ACCP) Consensus Conference on Antithrombotic Therapy are reviewed, with a focus on outpatient anticoagulation management in adults.

The recommendations of the fifth conference cover initiation of warfarin therapy, hemorrhagic complications, management of excessive anticoagulation, interruption of warfarin therapy for patients requiring surgery, nonvalvular atrial fibrillation, cardioversion in patients with atrial fibrillation, valvular heart disease, mechanical and biological prosthetic heart valves, coronary artery disease, saphenous vein and internal mammary artery bypass grafts, peripheral arterial occlusive disease, prevention of venous thromboembolism, treatment of venous thromboembolism, stroke prevention in patients with cerebrovascular disease, and pregnancy.

Leff B, Burton L, Guido S, et al. Home hospital

program: A pilot study. J Am Geriatrics Soc 1999; 47:697-702. ★

A pilot prospective case series was undertaken to evaluate the basic safety and feasibility of hospital care at home (Home Hospital (HH)) for treating acutely ill older persons requiring hospitalisation for community-acquired pneumonia, chronic heart failure, chronic obstructive airways disease, or cellulitis.

Only 17 patients were treated in HH, 122 could not be enrolled because they presented for admission at times when HH was not operational and 6 patients refused to enrol in HH. Subjects treated in HH had comparable clinical outcomes to those treated in the acute hospital and were highly satisfied with HH. Charges for HH care were 60% of those for the acute hospital care. In this pilot study, HH was safe, feasible, highly satisfactory, and cost-effective for certain acutely ill older persons who required acute hospitalisation.

Callahan RR. Patient care coordination of adult oncology patients in home health. Home Health Care Manag Practice 1999; 11:33-40.

This article illustrates several key components regarding caring for adult oncology patients at home, including the oncology nurse as the patient care coordinator (PCC).

As managed care changes the timing of discharge from the acute care setting into the home, oncology nurses are assuming more responsibilities relating to appropriate home care and teaching. Case studies are provided as examples of oncology care provided by the PCC. Oncology nurses assist patients and families with various issues such as: listening to underlying concerns, providing physical care, managing pain with patient control analgesia (PCA) when appropriate, and offering comfort care/support during a patient's death and dying process.

Mombelli G, Pezzoli R, Pinoja-Lutz G, et al. Oral vs Intravenous ciprofloxacin in the initial empirical management of sever pyelonephritis or complicated urinary tract infections. Arch Internal Med 1999; 159: 53-58. ★

A multicenter, prospective, randomized trial was undertaken to compare oral (500 mg twice daily) to intravenous ciprofloxacin (200 mg twice daily) in the initial empirical management of hospitalized patients with serious forms of urinary tract infection (UTI). The study population included patients with pyelonephritis, community-acquired UTIs, and hospital-acquired UTIs. Seventy-two patients were randomized to treatment with oral and 69 to intravenous ciprofloxacin.

The mean duration of fever was 1.7 days in

patients treated by the oral and 1.9 days in patients treated by the intravenous route ($p = 0.15$). The rates of microbiological failure (3% in the oral, 2% in the intravenous treatment group) and of unsatisfactory clinical response (4% oral vs 3% intravenous) were low. There were no infection-related deaths. A treatment change was eventually required in 14% of the patients assigned to the oral and 7% of the patients assigned to the intravenous regimen, mainly because of the isolation of enterococci or ciprofloxacin-resistant organisms in pre-therapy urine specimens.

In the hospital setting, oral ciprofloxacin is as effective as the intravenous regimen in the initial empirical management of serious UTIs. The efficacy of oral ciprofloxacin indicates a potential use in the outpatient treatment of a subset of currently hospitalised patients.

List of Medline and Cinahl articles

Cardiology

Dubrey SW, Banner N. Home inotrope treatment for intractable heart failure following heart transplantation. *Heart* 1999; 82:248-51 ★

Savage L, Grap M. Telephone monitoring after early discharge for cardiac surgery patients. *Am J Crit Care* 1999; 8:154-9 ★

Stanek B, Surm B, Frey B, et al. Bridging to heart transplantation: Prostaglandin E1 versus Prostacyclin versus Dobutamine. *J Heart Lung Transpl* 1999; 18:358-66 ★

Stewart S, Vandebroek AJ, Pearson S, Horowitz JD. Prolonged beneficial effects of a home-based intervention on unplanned readmissions and mortality among patients with congestive heart failure. *Arch Intern Med* 1999; 159:257-261 ★

Zed P, Tisdale J, Borzak S. Low-molecular-weight heparins in the management of acute coronary syndromes. *Arch Intern Med* 1999; 159:1849-57 ★

Carers

Jepson C, McCorkle R, Adler D, et al. Clinical scholarship. Effects of home care on caregivers' psychosocial status. *Image - J Nursing Scholarship* 1999; 31:115-20 ★

Smith C. Caregiving effectiveness in families managing complex technology at home: Replication of a model. *Nursing Research* 1999; 48:120-8 ★

Catheter Complications

Herbst S, Kaplan L, McKinnon B. Proactive management of catheter complications in home care. *Infusion* 1999; 4:22-9 ★

Mazzola JR, Schott-Baer D, Addy L. Clinical factors associated with the development of phlebitis after insertion of a peripherally inserted central catheter. *J Intraven Nursing* 1999; 22:36-42 ★

Cost Analysis

Deshotels D. By the hour: Time-based cost analysis. *Infusion* 1999; 5:33-7 ★

Jones J, Wilson A, Parker H et al. Economic evaluation of hospital at home versus hospital care: Cost minimisation analysis of data from randomised controlled trial. *Br Med J* 1999; 319: 1547-50 ★

Cultural Diversity

Riley M, Thelian K. Attachment impacts a culturally diverse population in the homecare setting *J Intraven Nursing* 1999; 22:325-30 ★

Deep Vein Thrombosis

Baron R, Goldhaber S. Deep venous thrombosis: Outpatient management is now FDA approved. *J Thrombosis Thrombolysis* 1999; 7: 113-22 ★

Bick R. Therapy for venous thrombosis: Guidelines for a competent and cost-effective approach. *Clin App Thrombosis-Hemostasis* 1999; 5:2-9 ★

Carman T, Fernandez Jr B. Issues and controversies in venous thromboembolism. *Cleveland Clin J Med* 1999; 66:113-23 ★

Deitcher S, Olin J, Bartholomew J. How to use low-molecular weight heparin for outpatient management of deep vein thrombosis. *Cleveland Clinic J Med* 1999; 66:329-31 ★

Freedman M, Young M. Venous thrombosis: Diagnosis and treatment; new methods and strategies for management. *Comprehensive Therapy* 1999; 25:13-9 ★

Howard P, Burenbeide K. Low molecular weight and unfractionated heparins: An analysis of prescribing patterns and outcomes. *Hosp Pharm* 1999; 34:1065-71 ★

Koopman M. Outpatient treatment of deep vein thrombosis with LMWH. *Wien Med Wochenschr* 1999; 149:46-9

O'Brien B, Levine M, Willan A et al. Economic evaluation of outpatient treatment with low-molecular-weight heparin for proximal vein treatment. *Arch Intern Med* 1999; 159:2298-304 ★

Pasquariello F, Kurol M, Wiberg S, Krekmanova M, Leppert J. Diagnosis of deep venous thrombosis of the lower limbs: is it premature to introduce ultrasound as a routine method. *Angiology* 1999; 50:31-6 ★

Perrier A, Desmarais S, Miron M, et al. Non-invasive diagnosis of venous thromboembolism in outpatients. *Lancet* 1999; 353:190-5 ★

Rodgers G. Inappropriate use of enoxaparin in the treatment of deep-vein thrombosis. *N Engl J Med* 1999; 340:62 ★

Sachdev GP, Ohlrogge KD, Johnson CL. Review of the Fifth American College of Chest Physicians Consensus Conference on Antithrombotic Therapy: Outpatient management for adults. *Am J Health-System Pharm* 1999; 56:1505-14 ★

Spandorfer J, Lynch S, Weitz H, Fertel S, Merli G. Use of enoxaparin for the chronically anticoagulated patient before and after procedures. *Am J Cardiol* 1999; 84:478-80 ★

Turpie, AGG. Customizing our approach in deep vein thrombosis and pulmonary embolism treatment: overview of our clinical experience. *Blood Coagulation & Fibrinolysis* 1999; 10(Suppl 2): 107-115 ★

Devices and Appliances

Banks N. Positive outcome after looped peripherally inserted central catheter malposition: a case study. *J Intraven Nursing* 1999; 22:14-18 ★

Chan Kim H, Han Bae Y, Wan Kim S. Innovative ambulatory drug delivery system using an electrolytic hydrogel infusion pump. *IEEE Transactions on Biomedical Engineering*. 1999; 46:663-9 ★

Chung M, Akahoshi M. Reducing home nursing visit costs using a remote access infusion pump system. *J Intraven Nursing* 1999; 22:309-14 ★

Cole D. Selection and management of central venous access devices in the home setting. *J Intraven Nursing* 1999; 22:315-9 ★

Gonzales A, Pestka C, Silverstein F, Golden R. Peripherally inserted central catheter placement in swine using magnet detection. *J Intraven Nursing* 1999; 22:144-50 ★

Schneider P. A review of the safety of intravenous drug delivery systems. *Hosp Pharm* 1999; 34:1044-56 ★

Sheppard K, LeDesma M, Morris N, O'Connor K. A prospective study of two intravenous catheter securement techniques in a skilled nursing facility. *J Intraven Nursing* 1999; 22:151-6 ★

Thomson S. Documentation form for PICC/midline usage. *Spectrum* 1999; 11: 1 ★

Diabetes

Fryhling Corbett C. Research-based practice implications for patients with diabetes. Part 2: Diabetes self-efficacy. *Home Healthcare Nurse* 1999; 17:587-96 ★

Drug Therapy

Akkerman S, Zhang H, Mullins R, Yaughn K. Stability of milrinone lactate in the presence of 29 critical care drugs and 4 IV solutions. *AJHP Online* 1999; 56:1-2 ★

Brennan V, Bentley N. Home advantage - High-dose intravenous immunoglobulin. *Nursing Times* 1999; 95:38-9

D'haens G, Van Deventer S, Van Hogezaand R et al. Treatment of Crohn's Disease: The role of Infliximab. *Gastroenterology* 1999; 116:1029-34 ★

Gonzales R, Steiner J, Lum A, Barrett P. Decreasing antibiotic use in ambulatory practice. *JAMA* 1999; 281:1512-19 ★

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Ramirez J, Vargas S, Ritter G et al. Early switch from intravenous to oral antibiotics and early hospital discharge. *Arch Intern Med* 1999; 159:2449-54 ★

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Zsigmond E, Darby P, Koenig H, Goll E. Painless intravenous catheterization by intradermal jet injection of lidocaine: A randomized trial. *J Clinical Anesthesia* 1999; 11: 87-94 ★

Education and Training

Gonzalez LO, Webb MS, Lowry LW, Lengacher CA. Baccalaureate nursing education and home health: a collaborative alliance. *Nursing connections* 1999; 12:35-48

Elderly

Berkman P, Heinik J, Rosenthal M, Burke M. Supportive telephone outreach as an interventional strategy for elderly patients in a period of crisis. *Social Work in Health Care* 1999; 28:63-76 ★

Edes T. Comprehensive home care after hospitalization of elderly patients. *JAMA* 1999; 282: 1129 ★

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