Clinical pathways in home nutrition support

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ABSTRACT

In home-care settings, physicians with various medical specialties may order home enteral and/or parenteral nutrition support. Clinical pathways may be used to provide a clear, concise, standardized method for ordering and monitoring home nutrition support. The clinical pathways should be appropriate for 80% of the patients placed on the pathways, allowing for a 20% variance, or deviation, from the pathway. In one home-care facility, disease-specific clinical pathways have been used for longer than 1 year for patients with a variety of diseases requiring home nutrition support. To determine the usefulness of the home nutrition support clinical pathways, data obtained from 20 patients were analyzed. Patients were followed up while being treated using home nutrition support clinical pathways designed for oncology (9 patients), human immunodeficiency virus/acquired immunodeficiency syndrome (2 patients), short bowel syndrome (6 patients), and hyperemesis (3 patients) for 191 weeks. Overall, an average variance (deviation from the pathway) of 22% (the number of variances divided by the total weeks of therapy) was observed. The use of the pathways to provide enteral or parenteral nutrition facilitated more cost-effective care by following pathway guidelines for obtaining laboratory values and patient visits. Communication between the home-care staff and the physician was also improved. Clinical pathways can enable standardization of care for patients receiving nutrition support at home. *J Am Diet Assoc. 1997; 97:1003-1007.*

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Physicians with expertise in many different medical specialties order home enteral and/or parenteral nutrition support (1). Most physicians obtain their knowledge of nutrition support during their residency training. Because the content of residency programs varies, the nutrition support component can range from minimal to substantial (2,3). In the hospital, a physician may have the option of consulting a nutrition support team or nutrition support specialist (eg, dietitian, nurse, or pharmacist) with specialized training. In alternative-site care settings, these nutrition support specialists may not be accessible (4). The American Society for Parenteral and Enteral Nutrition has published guidelines on the provision of nutrition support that include standards of practice and standards of care for home nutrition support (5). Clinical pathways have been instituted in hospitals to standardize and improve patient care. In this article we will review clinical pathway methodology and demonstrate the implementation of clinical pathways to provide a clear, concise method for ordering and monitoring home nutrition support.

CLINICAL PATHWAYS

A clinical pathway is defined as an optimal sequencing or timing of interventions by physicians, nurses, and other staff for a particular diagnosis or procedure, designed to better utilize resources, maximize quality of care, and minimize delays (6). Many terms are used to describe clinical pathways, such as critical pathways and care mapping. In the 1970s, the construction and engineering fields used critical pathways to manage complex projects (7). In the health care field, with the advent of diagnosis-related groups in the 1980s and the expan-

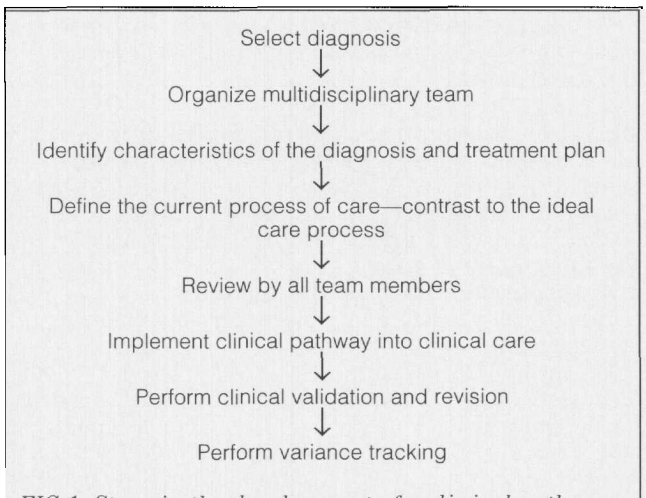

FIG 1. Steps in the development of a clinical pathway.

Home Enteral Monitoring

Dates							
Parameters	**Baseline**	**Day 3**	**Week 2**	**Week 3**	**Week 4**	**Week 6**	**Week 8**
Laboratory Studies	Chemical Profile, Mg, CBC, PT				Chemical Profile, Mg, Zn		
CNN Clinical Assessment							
1) Physical & Nutrition Assessment - Pt/therapy compliance	√	√ Phone Contact	√		√		
2) Quality of Life - SF-36	√				√		√
3) Karnofsky Functional Scale	√				√		√
Communications Quarterly Summary							

Dates							
Parameters	**Week 12**	**Month 4**	**Month 5**	**Month 6**	**Month 9**	**Month 12**	**Month 18**
Laboratory Studies	Chemical Profile, Mg, Fe			Chemical Profile, Mg, Fe		Chemical Profile, Mg, CBC, Fe	Chemical Profile, Fe
CNN Clinical Assessment							
1) Physical & Nutrition Assessment - Pt/therapy compliance	√			√		√	√
2) Quality of Life - SF-36				√		√ then every 6 months	
3) Karnofsky Functional Scale				√		√ then every 6 months	
Communications Quarterly Summary	√			√	√	√	

FIG 2A. Home enteral monitoring portion of a sample human immunodeficiency virus clinical pathway for home nutrition support for adults. Reprinted with permission from Coram Healthcare Corp, Denver, Colo.

sion of technology, critical pathway methodology was used by hospital reimbursement systems to clinically evaluate how patients were treated and how resources were consumed. Currently, clinical pathways are being applied in hospital settings and patient management systems for home health care to organize information related to patient outcomes and to review diagnostic categories that represent high cost, high risk, and high variability to provide a quality outcome to a particular patient population (8).

The goal of clinical pathways in health care is to define processes in disease state management. The benefits of defining the processes are a reduction in length of stay, reduced costs associated with specific diagnoses and procedures, and development of standardized treatment protocols culminating in enhanced patient outcomes. A completed clinical pathway should have validity, reliability, reproducibility, clinical applicability, clinical flexibility, and clarity as defined by the Institute of Medicine (9). Clinical pathways should be validated and reviewed on a regular basis and whenever data collection indicates that a substantial number of variances (unexpected or unplanned events causing a deviation from the pathway) have occurred.

CLINICAL PATHWAY DEVELOPMENT

To begin the development of a clinical pathway, a diagnosis is selected, usually one that is associated with high cost to the hospital, provider, or health care company, and with greatest variability in care provided. The diagnosis or procedure selected should be one that represents risk to the organization, such as high volume, high cost, and high variability in practice. High volume for a select diagnosis and/or procedure will allow the clinical pathway to standardize care, and thus decrease

Home TPN Monitoring

Dates							
Parameters	**Baseline**	**Week 1**	**Week 2**	**Week 3**	**Week 4**	**Week 6**	**Week 8**
Laboratory Studies*	Chemical Profile, Mg, CBC, PT	Chemical Profile, Mg, CBC, Trig	Chemical Profile, Mg		Chemical Profile, Mg, CBC	Chemical Profile, Mg	Chemical Profile, Mg, CBC
CNN Clinical Assessment							
1) Physical & Nutrition Assessment - Pt/therapy compliance	√	2 - 4	0 - 1	0 - 1	0 - 1	√	2/month - 2nd month
2) Quality of Life - SF-36	√				√		√
3) Karnofsky Functional Scale	√				√		√
Communications Quarterly Summary							

Dates							
Parameters	**Week 12**	**Month 4**	**Month 5**	**Month 6**	**Month 9**	**Month 12**	**Month 18**
Laboratory Studies*	Chemical Profile, Mg, CBC, Fe	Chemical Profile, Mg	Chemical Profile, Mg	Chemical Profile, Mg, CBC, Trig	Chemical Profile, Mg, CBC, PT, Fe	Chemical Profile, Mg, CBC, Fe	Chemical Profile, Fe CBC (then every 6 months)
CNN Clinical Assessment							
1) Physical & Nutrition Assessment - Pt/therapy compliance	1/month - 3rd month			√ then every 6 months		√	√
2) Quality of Life - SF-36				√		√	√ then every 6 months
3) Karnofsky Functional Scale				√		√	√ then every 6 months
Communications Quarterly Summary	√			√	√	√	

* Protime will be checked when: PT > 14.5; Elevated LFT; Patient receiving antibiotics; Patient on anticoagulant.

FIG 2B. Home total parenteral nutrition (TPN) monitoring portion of a sample human immunodeficiency virus clinical pathway for home nutrition support for adults. Reprinted with permission from Coram Healthcare Corp, Denver, Colo.

cost of care and improve patient outcomes. High-risk procedures or those that are expensive can be modified using a clinical pathway to clearly define appropriate criteria so that the institution, for example, can regulate the use of its valuable resources and decrease patient risk.

Several steps are included in the development of clinical pathways (10) (Figure 1). First, the procedure, therapy, or diagnosis is identified, as well as the scope of the clinical pathway. The scope of the clinical pathway may cover an entire episode of care, such as hospitalization, home care, or preoperative care, or it may cover a more comprehensive spectrum of care. Next, the categories of critical actions or interventions are identified. These may include consultations, assessments, teaching, treatments, nutrition care, and medications. The expected or desired outcomes and patient responses must then be defined so that the pathway is directed at meeting these goals.

Finally, appropriate and accurate documentation must be included. Clinical pathways should become a part of the patient's medical record, with the interventions documented on the pathway itself. Documentation, an integral part of the successful use of the pathway, may also be done separately. The pathway becomes a research tool and continuous quality improvement instrument each time it is used. Diagnoses that require treatments that represent high variability can be streamlined using clinical pathways to eliminate multiple, conflicting practice patterns and focus resources on the pathway with the best patient outcomes.

Transition from TPN to Enteral Therapy

Dates							
Parameters	**Week 1**	**Week 2**	**Week 3**	**Week 4**	**Week 5**	**Week 6**	**Week 8**
TPN Prescription	Progressively decrease days on TPN every 1 - 2 weeks				Discontinue TPN		
Laboratory Studies	Lytes, Mg, Phos, BUN/ Creat	Lytes, Mg, Phos, BUN/ Creat	Lytes, Mg, Phos, BUN/ Creat	Lytes, Mg, Phos, BUN/ Creat		Lytes, Mg, Phos, BUN/ Creat	Lytes, Mg, Phos, BUN/ Creat
CNN Clinical Assessment							
1) Physical & Nutrition Assessment - Pt/therapy compliance	√	√	√	√			√
2) Quality of Life - SF-36	√			√			√
3) Karnofsky Functional Scale	√			√			√

FIG 2C. Transition from total parenteral nutrition (TPN) to enteral therapy portion of a sample human immunodeficiency virus clinical pathway for home nutrition support for adults. Reprinted with permission from Coram Healthcare Corp, Denver, Colo.

Table
Types of clinical pathway variances for 191 weeks of therapy and number (percent of total) for all pathway patients (n=20)

Type	No.	%[a]
Gastrointestinal bleeding	1	2
Nausea/vomiting	1	2
Patient hospitalized	11	27
Date/time of therapy changed	1	2
Added orders	6	15
Fever	5	12
Bleeding	1	2
Abnormal laboratory result	3	7
Electrolyte abnormality	2	5
Central venous breakage	1	2
Central venous occlusion	1	2
Venous access device change	1	2
Pathway change	1	2
Other (undefined)	6	15
Total variances	41	

[a]Percentages do not total 100% because of rounding.

A multidisciplinary team including all practitioners who participate in patient care should be included in the development and review of the clinical pathway. A team leader is identified who, although not necessarily a clinician, can manage a team effectively. Current care is identified and benchmarked with published standards, if available, and then compared with the ideal care process. The multidisciplinary team works together to see how these processes can be revised or adapted to better meet the needs of the patient or to use resources more effectively. Consensus must be reached before the pathway can be implemented, and current literature and research should be used to validate the clinical pathway selected. To be useful and accurate, a clinical pathway requires clinical validation and revision. Data collection tools should be developed to determine the effectiveness of the pathway and to identify where a variance has occurred. Staff should be trained in the use of the pathway, the data collection process, and the documentation parameters.

Staff who use the pathway play a key role in determining the effectiveness of the pathway and in recognizing the need for revisions. Patient responses to the interventions of the clinical pathway are critical in evaluating the overall effectiveness of the plan.

A satisfactory clinical pathway should be effective for an average of at least 80% of the target patient population, meeting the needs of most of the patients while achieving the desired outcomes or pathway goals. The expected outcomes should be well defined during the development of the clinical pathway. The outcomes should be attainable and measurable; such as weight maintenance or a percentage of weight gain, or number of days of hospitalization. For patients who do not achieve desired outcomes, the variances should be analyzed and trends should be identified. Variances may be either positive (eg, goal is achieved early) or negative (eg, goal is delayed or an unexpected event occurs). Variances may result from a patient's unexpected response to therapy, a family's decisions regarding therapy, clinician intervention, or actions of the health care system. If these variances occur repeatedly, a change in the pathway may be warranted. The pathway's original objective should be reviewed to ensure that the changes are in accordance with the objectives identified during the development of the pathway.

USE OF THE CLINICAL PATHWAY

Clinical pathway data and outcomes were collected in a home-care facility where clinical pathways had been used for longer than 1 year for patients with a variety of diseases (11). These clinical pathways were developed by a multidisciplinary team with expertise in nutrition support, including physicians, dietitians, nurses, and pharmacists assembled by the home care company; the team was headed by a nurse with prior experience in clinical pathway development. Pathways were developed to address the high cost of home nutrition support,

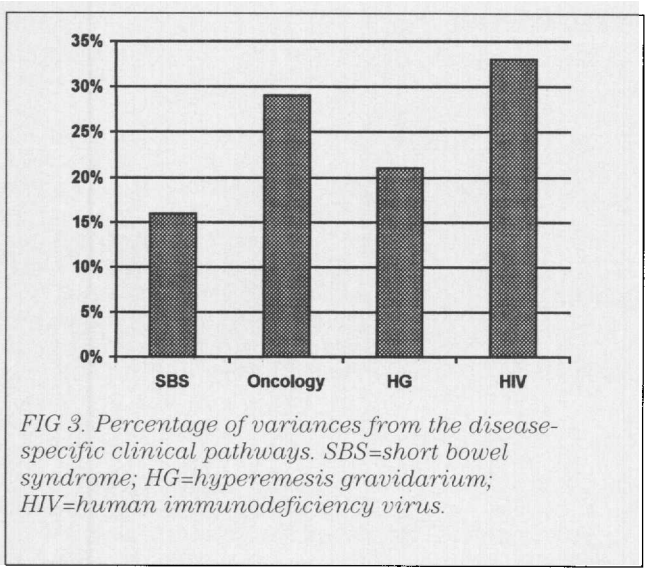

FIG 3. Percentage of variances from the disease-specific clinical pathways. SBS=short bowel syndrome; HG=hyperemesis gravidarium; HIV=human immunodeficiency virus.

especially parenteral nutrition therapy, and the lack of standardized therapy. The goals of the clinical pathways were:

- to standardize clinical monitoring so that excessive and inappropriate monitoring were avoided;
- to make the referring physician aware of the type and timing of the clinical monitoring; and
- to maximize each clinician's time by using clinical pathways to monitor the patients. In addition, costs could be quantified, providing for more cost-effective nutrition care.

Twenty adult patients were followed up using home nutrition support clinical pathways designed for oncology (9 patients), human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) (2 patients), short bowel syndrome (6 patients), and hyperemesis gravidarium (3 patients). An example of the home nutrition support clinical pathway for HIV/AIDS is presented in Figure 2. Patients were placed on the clinical pathway that matched their primary diagnosis. Initiation of the clinical pathway ideally began before the patient was discharged to home nutrition support. After being discharged to their homes, 20 adult patients were followed up using the appropriate clinical pathway until they were discharged from home-care service. Nutrition support team rounds were conducted weekly. This team consisted of a nurse coordinator, a physician, a pharmacist, and two dietitians (12,13).

Data were collected for all patients for a total of 191 weeks of nutrition therapy between July 1994 and August 1995. All of the oncology, HIV/AIDS, and short bowel syndrome clinical pathway patients required total parenteral nutrition support. Three women were followed up on the hyperemesis gravidarium clinical pathway: two on total parenteral nutrition and one on enteral nutrition. Enteral nutrition support for patients with hyperemesis gravidarium has been described as a viable therapy but is not often used. This cost-effective approach was monitored using the unique hyperemesis-specific clinical pathway.

Overall, an average variance or deviation from the disease-specific home nutrition support pathways of 22% was observed. Variances were calculated by dividing the number deviations from the clinical pathway by the total weeks of nutrition therapy. The types of variances observed are listed in the Table. Variances by disease-specific pathway are found in Figure 3. Cost data were not included in this study; however, following the prescribed clinical pathway maximizes the effectiveness of clinical care and therefore would be more cost-effective than nonstandard clinical care.

The clinical pathways were effective for standardizing and coordinating the nutrition care of these patients receiving home nutrition support. In addition, the staff and referring physicians found that using clinical pathways to provide enteral or total parenteral nutrition improved communication between the home care staff and the referring physician, and provided clinical guidance for the physicians who only occasionally order enteral or total parenteral nutrition. Total parenteral nutrition remains an expensive therapy that must be carefully monitored. The use of clinical pathways to provide home nutrition support can facilitate cost-effective nutrition therapy through care coordination, appropriate therapy selection, and the use of goal-directed care.

APPLICATIONS

There are many benefits to using clinical pathways. Because they are designed by a multidisciplinary team, an interdisciplinary plan of care is developed. As demonstrated by this study, clinical pathways provide standardized care for patients receiving nutrition support at home, which helps eliminate or reduce variances in treatment protocols. Clinical pathways are an effective communication tool useful for patient and clinician education and orientation. Perhaps most important in the current health care environment, using clinical pathways is an effective way to control cost and provide for comprehensive quality care. ■

The clinical pathway study data was presented at the American Society for Parenteral and Enteral Nutrition 20th Clinical Congress in Washington, DC, January 16, 1996.

The study was completed through the Clinical Nutrition Network of Coram Healthcare.

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