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ORIGINAL ARTICLE

A cost calculation model for specialist palliative care for patients with non-small cell lung cancer in a tertiary centre

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Abstract
Goals of work Five-year survival of patients with non-small cell lung cancer (NSCLC) is below 15%. Therefore, an early integration of palliative care according to the 2002 WHO definition is indispensable. In this paper, we describe methodical and financial aspects of prospective pricing of palliative care within a concept of integrated care for patients with NSCLC in Germany.
Materials and methods Four structures of palliative care services were defined (hospital support, home care, day care and in-patient care). Prospectively, resource use was estimated, using real cost data from the finance department of the University Hospital. Resource use was forecasted on the basis of operating experience, data of the national core documentation of palliative care patients and recommendations from the European Commission.
Results Expected average hospital support team services were priced at 483 euros and budgeted for 10% (stage 1) to 90% (stage 4) of patients. Home care (60 visits, 4,573 euros) and day-care (5 visits) services were budgeted for between 5% (stage 1) and 30% (stage 4). The resulting prospective reimbursements range from 393 euros (stage 1) to 2,503 euros (stage 4). In-patient care was excluded from the prospective payments and reimbursed separately.
Conclusions For the first time, global reimbursements covering palliative care hospital support, home care and day care for patients with NSCLC were prospectively calculated and successfully negotiated. The contractual specification of palliative care services may contribute to transparency and quality in cancer care.

Keywords Palliative care · Integrated care · NSCLC · Reimbursement · Prospective pricing

Introduction

Lung cancer is the leading cause of cancer-related mortality, causing 37,000 deaths a year in Germany [9] and an estimated 1.1 million worldwide [15]. This is due to high incidence and the fact that in >70% of patients, the diagnosis is made in an advanced stage of the disease [International Union Against Cancer (UICC) stages III and IV] [5, 13] without a curative surgical treatment option. During the past years, management of non-small cell lung cancer (NSCLC), which accounts for approximately 80% of lung cancers, has undergone major changes. However, still the overall 5-year survival rates are below 15%, and more than 50% of patients diagnosed in the late stages die within the first year after diagnosis [5]. Thus, an early integration of palliative care services and expertise is indispensable for an optimised treatment and comprehensive care for patients and relatives.

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As a matter of fact, in 2002 the World Health Organisation (WHO) has redefined the concept of palliative care [14], and calls for an earlier involvement of palliative care in the course of a potentially life-threatening disease. This reasonable approach meets the needs of patients with NSCLC, but it also multiplies responsibilities of palliative care services and requires increased financing.

However, to date financing palliative care services in Germany is inadequate. Reimbursements within the G-DRG (German Diagnosis-Related Groups) are not sufficient to finance palliative care to an adequate extent. Besides the unsolved financing, structural deficits within the German health care system—above all the strict separation of the outpatient and inpatient sectors—hamper a patient-centred, needs-oriented and—according to the definition of the WHO—“preventive” palliative care approach.

To reduce these shortcomings, the Statutory Health Insurance (SHI) Modernisation Act was introduced in Germany in 2004. One major focus of this legislation was the provision of substantial financial incentives for comprehensive integrated care. Every sickness fund is required to retain 1% of its overall payment for tenders for integrated care in the year 2004 to 2006. This act might overcome the prementioned strict separation of the sectors and facilitate an early, sector-free integration of palliative care into a system of integrated patient care.

In this study, we report methodical, financial and health political aspects of a contract for the provision of integrated care including palliative care as a fundamental component for patients with NSCLC between the largest German sickness fund (Barmer Ersatzkasse-BARMER) and the University Hospital of Cologne UHC). Since July 2006, three further major sickness funds joined the contract, so the majority of patients with NSCLC can enter the integrated care model.

Materials and methods

The methodology of this contract comprises a consensus process between providers and payers on the extension of existing palliative care services leading to a pragmatic cost-calculation model for pricing. Specification of the contract for integrated care was done by a negotiation committee made up of two members of UHC’s finance department, four UHC physicians (one medical oncologist, one surgeon, one radiotherapist and one palliative care specialist), two representatives from BARMER sickness fund and two independent physicians commissioned by BARMER. It was agreed that this program should bring forth a distinct improvement of interdisciplinary and cross-sectoral co-operation and permit optimised state-of-the-art care. This implied explicit changes in treatment processes and, in the case of palliative medicine, a strong expansion of services provided. Therefore, the specification and pricing of palliative medicine could not reflect past treatments but had to be modelled in advance. Furthermore, BARMER wished the agreement of prospective fixed price reimbursements, as these were assumed to lead to increased efficiency of resource use. To compile an appropriate catalogue of areas of service, the negotiation committee took into account published work on palliative care treatment patterns, especially the results of a nation-wide study on structural quality and outcome of core documentation in German palliative care units. This study described patient characteristics, symptoms and interventions in German palliative care institutions collected in the year 2001 [8, 11]. More specific data on symptoms of patients with lung cancer recently published in the UK [7] were also used for the catalogue, as well as results from the USA [3, 10] [6] and from an international study [12]. However, the existing literature provided only limited information on the specifics of palliative care for patients with NSCLC, and empirical findings alone could not serve as a basis for a new and comprehensive concept of palliative care, anyway. In particular, existing structures do not adequately take into account the need for palliative care hospital support teams described and published by the European Commission Community Research Program [4], which was, therefore, incorporated in the analysis.

After the determination of four areas of palliative care (hospital support team, home care team, day care centre, inpatient care), the associated levels of resource use, especially in terms of labour time for physicians, nurses and social workers, were first estimated on the basis of the German core documentation [8, 11] as well as the cancer service guidance documents (manual, economic review and research evidence) for supportive and palliative care of the National Institute of Clinical Excellence (NICE; www.nice.org.uk). Labour time requirements for the hospital support and home care teams were then empirically verified by evaluating 25 patients in hospital support (over a 6-week period) at UHC and 40 patients in specialised home care (covering a 10-month period) in the Cologne area.

The percentages of utilization of the four areas of care were estimated separately for each stage (UICC I-IV) of the disease.

Finally, resource use was valued using a pragmatic approach. Labour cost of outpatient services (hospital support team and home care team) was priced using real cost data provided by UHC’s finance department. As the palliative day-care centre had not yet been put into operation at the time of the negotiations, day-care costs were estimated by calculating the average of day-care reimbursements at oncology departments at the 35 German university hospitals. It was agreed that inpatient care was excluded from the prospective fixed price reimbursements and should be paid separately on the basis of fixed prices per day independent from the G-DRG.

Results

Within the integrated care model, palliative medicine offers four different modules with needs-adapted levels of care.

Module 1: Hospital support team

Palliative care aspects should be integrated into the concept of management at an early stage. The aim is—from the palliative care perspective—to improve the patient's medical, nursing and psychosocial care within the hospital. The patient's quality of life can be improved through prevention of symptoms and therapy complications and—if applicable—through shortening of inpatient stays. The service offers

- Assessment and evaluation of medical, nursing and social needs and development of a long-term palliative care concept
- Assessment and, if necessary, modification of symptom control and pain management as well as support in the terminal phase, if patients die on the ward
- Communication about the course of the disease with patients and relatives
- Participation in treatment decisions
- Advice for the primary medical, nursing and social staff on the wards
- Organisation of home care (e.g. support in obtaining medical appliances, selection of services)
- Contact to public authorities (e.g. support in classification of nursing levels, social welfare)

Pricing of module 1 was performed for two different settings—first visit and follow-up visit. Labour time for the first visit was set at 90 min for the palliative care specialist (labour cost, 0.72 euro/min), 60 min for the nurse (0.41 euro/min) and 90 min for the social worker (0.52 euro/min). This sums up to 136.20 euros for the first visit.

Labour time for a follow-up visit was budgeted at 45 min for the physician, the nurse and the social worker alike. Based on the hospital support team's past care for cancer patients at UHC, an average of 4.67 follow ups was determined, amounting to 346.50 euros. The total fee for first and follow-up visits by the hospital support team amounted to 482.70 euros.

Module 2: Home care team

Medical, nursing and social work expertise within the field of palliative care offered for the home care setting can facilitate an early discharge of patients and prevent unnecessary (re)admissions to the hospital even in patients with far advanced diseases. The patient's quality of life can be improved through sufficient symptom control and holistic care. One aim is to make dying at home possible. The service is offered to patients living within a radius of about 10 km from UHC and offers

- Basic nursing support
- Specialised palliative care
- Pain therapy and symptom control
- Wound care
- Artificial nutrition if necessary
- Social work (e.g. support in obtaining medical appliances, in classification of nursing levels, integration of volunteers)
- Support in the terminal phase
- 24-h/7-day availability at home

As for module 1, pricing of module 2 was performed for two settings—first and follow-up visit. Labour times (including travel time) for the first visit was determined to be 90 min for the physician, 180 min for the nurse and 80 min for the social worker. Including cost for transportation, this sums up to 183.20 euros for the first visit.

An average of two follow-up visits per day were budgeted. Labour times for the follow-up visits were set at 20 min for the physician (value based upon an average frequency visiting the patient every second day), 120 min for the nurse and 15 min for the social worker. With cost for transportation included, this sums up to 74.40 euros per follow-up visit. The average duration of home care was estimated at 30 days. First (183.20 euros) and follow-up visits (59×74.40 euros) for module 2 home care team added up to 4,572.80 euros. It was assumed that 50% of the patients live within the area in which the service is provided.

Module 3: Day-care centre

The palliative day-care centre represents the most innovative part of the development of the Department of Palliative Medicine in Cologne. Aims are to facilitate the transition from inpatient to home care and to provide short-term palliative care thus avoiding unnecessary hospitalisation. Due to the lack of cost data of palliative day care, the average per diem charge of 35 oncological day-care centres at university hospitals in Germany was used as an estimate. This reflects the fact that the day-care centre has to provide, in addition to symptom management, a highly labour-intensive multiprofessional service. The rate was determined at 435 euros per day. The number of days patients spent in the day-care centre can vary widely. An analysis of 35 patients with advanced lung cancer (small-cell lung cancer and NSCLC) at the oncology day-care centre at the University Hospital Cologne gave an average of 5.33 days during a 1-year period after diagnosis. This figure was budgeted, giving a price of 2,319 euros for palliative day care.

Module 4: Inpatient palliative care unit

If the other services (modules 1–3) are unable to provide adequate care such as symptom control, then patients will be admitted to the palliative care ward. Due to the considerable cost of inpatient treatment and an expected high variation in utilization over the program duration of 1 year, the negotiation committee decided that agreement of a fixed fee would lead to an incalculable financial risk for the University Hospital Cologne due to possible extreme outliers. Inpatient stays will, therefore, be reimbursed separately on the basis of fixed prices (2005, 307 euros/day; 2006, 397 euros/day) beyond the DRG-System and outside of the presented integrated care concept.

Stage-based estimation of utilization of modules 1–3 and determination of global fees

After cost estimations for modules 1–3 had been agreed by the negotiation committee, it was still necessary to forecast the percentages of patients in the integrated care program who will actually utilise these services. Clearly, great differences in utilization were expected for the different stages of the disease. Published data on symptoms and survival (see "Materials and methods") served as rough reference points. However, the agreement of utilization percentages and, consequently, global fees by the negotiation committee which is presented in Table 1 remain somewhat arbitrary. It was therefore agreed to revise stage-based resource use and pricing of the three modules on the basis of empirical data from the first year after the beginning of patient recruitment into this program.

Table 1 Module prices, estimated stage-based utilizations and agreed global fees for modules 1–3

	Stage 1	Stage 2	Stage 3	Stage 4
Module 1	10%	15%	70%	90%
Hospital support team (482.70 euros)	48 euros	72 euros	338 euros	434 euros
Module 2	5%	5%	20%	30%
Home care team (4,572.80 euros)	229 euros	229 euros	915 euros	1,372 euros
Module 3	5%	5%	20%	30%
Day-care centre (2,319 euros)	116 euros	116 euros	464 euros	696 euros
Total global fee	393 euros	417 euros	1,717 euros	2,502 euros

Discussion

Insufficient and fragmented financing is a major concern in palliative medicine worldwide [1, 2, 16]. In Germany, the standing of palliative medicine has, traditionally, been comparatively low, and the German Association for Palliative Medicine has repeatedly warned that the introduction of G-DRGs in 2002 further endangers care for terminally ill patients (DGP 8.8.2002, DGP 30.12.2004, www.dgpalliativmedizin.de). This is a valid concern as DRG reimbursements are calculated on the basis of usual nationwide resource use and, thus, do not normally reflect special treatment structures and processes such as palliative care. Therefore, the provision of specialised inpatient palliative services is, within the DRG System, not reimbursed adequately, and the same holds for the outpatient setting. For inpatient care, however, a recently introduced operational procedure code for complex palliative care may improve reimbursement for those palliative care institutions which are financed in the DRG system. As a result of this, for the years 2005 and 2006, it was negotiated nationwide to enable reimbursement for inpatient palliative care outside the G-DRG system. The services can be compensated on the basis of fixed prices per day. For 2007, the negotiations concerning this matter are not finished yet.

In this context, the contract for integrated care for patients with NSCLC including a substantial amount of palliative care is a novelty in various aspects:

(1) For the first time, key elements of cross-sector palliative care for cancer patients, supplementing the pre-existing provision for specialised inpatient palliative care, have been specified and contractually agreed between a healthcare provider and a sickness fund. In particular, this is the first study reporting the agreement and reimbursement of a palliative hospital support team and comprehensive palliative home care in Europe. All existing elements of the conventional medical care (e.g. primary care, outpatient drug costs, inpatient care) and their financing stay untouched by this agreement.

(2) For the first time, a considerable part of palliative care (hospital support, home care and day care) is financed in the context of a global fee reimbursement system. This means that the amounts agreed for palliative care are paid prospectively by the sickness fund to the healthcare provider for every patient who enters the integrated care program irrespective of actual resource use.

Calculation of fees was mainly based on expert estimation of resource use, existing literature and to a limited extent on empirical data. Therefore it is not clear to what extent they represent actual costs. In particular, labour times for hospital support and home care teams were based on rough approximations. For example, it is possible that actual physicians' visits may be less frequent than forecasted, especially when follow up by nurses is implemented with telephone support from physicians. Labour time for this telephone support would, then, have to be included. As outlined, both the scope of palliative care services and fees were a matter of negotiation, and no adequate empirical data are available to ascertain real costs. While the fees described in this paper will, clearly, require empirical verification and revision, we believe that our results may contribute to an increased transparency of the scope and pricing of palliative care services. Clearly, the assumptions of the cost-calculation model are specific to NSCLC, and any generalization to other cancer patients should be done with care. However, experience gained in this project will enable us to adapt this to other disease entities.

In view of the methodical shortcomings of the pricing method described in this study, it would have been very desirable to compare our results with published data on costs of palliative care. However, no publications could be found which would have allowed a meaningful comparison with the program presented in this paper. While there are a considerable number of articles which address costs of palliative care, many of them focus on specific drugs or interventions or mingle palliative care with other areas of care. To our knowledge, no study exists which identifies or estimates the costs of palliative care as specified in this program for patients with lung cancer or cancer in general over a period of 1 year from diagnosis.

The hospital-support-team services agreed in this program conform to the suggestions from the European Commission Expert Group [4]. These recommendations demand that all citizens should have access to high-quality palliative care services. This includes that palliative care services receive statutory, professional and societal recognition. The setting of the hospital support team at the UHC follows the precondition that a third profession besides the basic team members (physician and nurse) should be included. Following the necessities here in Cologne, a social worker is being implemented, as other potential professions, i.e. psychology, physiotherapy and spiritual care are already well established and available for palliative care patients cared for by the hospital support team. The formulated resource use for the single professions calculated in the presented study is far more concrete than the recommendations of the European Commission. They postulate that the need for additional time at this particular phase of a patient's life should be recognised also in financial considerations. The presented study is a precursor to concretise the above-mentioned recommendations.

The health political instrument of integrated care as introduced in the SHI Modernization Act of 2004 allows for very flexible contractual agreements between payers and health-care providers which can include payments for palliative care not adequately allowed for in the regular reimbursement structure. Therefore, integrated care can be regarded as a suitable tool of financing and, thereby, improving care for patients with incurable illnesses, in particular in regard of the refined WHO Definition of palliative care aiming on an early integration of specialised competencies. This early integration can only be established when aligned with an adequate financial basis. We believe that similar programmes could be agreed between sickness funds and health-care providers in other German regions or European countries. In this sense, this publication is intended to encourage comparable and, hopefully, even more refined initiatives for the financing and implementation of palliative care.

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