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ORIGINAL ARTICLE

Reduction in waiting time for diagnosis and treatment of head and neck cancer – a fast track study

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Abstract

Acceleration of diagnosis and initiation of treatment for head and neck cancer requires optimal organization and multidisciplinary collaboration. A project at the Head and Neck Oncology Centre, Aarhus University Hospital aimed at accelerating patient flow. *Material and methods*. Initiatives were implemented throughout the year 2007. Focus was on optimizing logistics for all patients referred to the center with suspected head and neck cancer. Initiatives included a fulltime case manager, pre-booked slots for clinical work-up and weekly tumor-boards. Key-dates were registered and relevant intervals were quantitatively evaluated and compared to a reference-group from 2006. *Results*. We registered 446 patients. Waiting times for first clinical examination on ENT department were reduced from median eight to median two days through 2007 (p < 0.0001). Time from first clinical examination and until referral for treatment was reduced from median 21 to median nine days (p < 0.0001). Time from referral to treatment and until initiation of treatment was reduced from median 26 to median 15 days (p < 0.001). The net result of these reductions was a reduced overall time from median 57 days ultimo 2006 to median 29 days ultimo 2007 (p < 0.0001). *Conclusion*. The current project has shown that it is possible to reduce waiting times in head and neck cancer. Through logistic changes, employment of a full-time case manager, strengthening the multidisciplinary tumor board and giving higher priority for head and neck cancer patients, the overall time from first suspicion of cancer until treatment start was reduced from 57 calendar days to 29 calendar days.

Head and neck cancer is a relatively infrequent disease with about 1000 new incidences each year among the five million inhabitants of Denmark [1]. Approximately 200 of these patients are received at Aarhus University Hospital, where they initially are being referred to the Department of Ear, Nose and Throat (ENT) or the Department of Oncology. All the relevant programs, with clinical work-up, treatment and regular follow-up are coordinated by these two departments in close collaboration with departments of pathology, neuro-radiology, and plastic surgery. The primary treatment is radiotherapy, surgery or a combination of these modalities. The national guidelines made by the Danish Head and Neck Cancer Group (DAHANCA) are followed, and patients are offered participation in clinical studies [2,3].

The issue of long waiting time related to clinical work-up and treatment is well known and has raised

the concern, that the positive effect of improved therapy is lost due to increased waiting time and more advanced disease before initiation of therapy. The consequence of increased waiting time is tumor growth, clinical upstaging and a deteriorated prognosis [4-6]. This was studied in a Danish project, where it was shown, that during a four week period a majority of oral cavity tumors developed a clinically significant progression [7]. With increasing complexity of the work-up procedures in head and neck cancer, there is a risk of prolonging the waiting period before initiation of treatment. In a study comparing the conditions in 1992 with 2002 it was documented, that the median interval from the first contact with the health care system and until the start of the final treatment was increased from 50 to 70 days, respectively [8]. Similar results were obtained internationally [9,10]. In the National Danish Cancer plan II

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from 2005 [11], the issue of reducing waiting time was therefore an area of high priority. The National Board of Health recommended all departments in Denmark to consider reorganizing usual procedures and introduce fast track clinical programs based on "diagnostic package solutions" in the effort of reducing the waiting time until initiation of treatment [12-14]. The implementation of such "package solution" is now continuously being introduced on a national level. This paper describes the experiences and quantitative data from a pilot-project focusing on fast-tracking patients in suspicion of head and neck cancer at Aarhus University Hospital in the calendar year 2007. The aim of the project was to establish an accelerated clinical program by reducing the waiting time for clinical work-up and treatment through reorganization of procedures and at the same time maintain or improve professional standards.

Material and methods

In the autumn of 2006 a working group was formed. To accelerate the clinical program for head and neck cancer patients, the group focused on logistics. The group consisted of physicians, nurses and secretaries from the involved departments. The group met regularly throughout the project period for continuous assessment, establishment of further initiatives and discussion of new ideas. The aim was, through reorganization of common practice, to streamline the course of the patient. Initially all procedures and intervals of the common clinical program for a patient on the departments was thoroughly described. Selected staff was interviewed to identify causes for delay. They were asked to suggest potential opportunities to make common practice more efficient both internally on the department but also externally among collaborating departments. This resulted in the following initiatives:

- 1. Establishing a case manager function (patient coordinator);
- 2. Changing the referral procedures from paper to oral, by enabling direct call to case manager (a hotline);
- 3. Introducing pre-booked slots in the outpatient clinic on the ENT Department;
- Faster pathology reports and imaging procedures;
- 5. Establishing a multidisciplinary tumorboard.

An experienced nurse with relevant knowledge regarding diagnostics and therapeutics in head and neck cancer issues and the internal logistics of the ENT department was recruited for a newly established position as project case manager. The case manager carried the overall responsibility for optimizing and accelerating the clinical work-up for each new patient as well as ensuring optimal use of the pre-booked slots in the outpatient clinic. The number of these slots was continuously adjusted to let the capacity correspond to the needs.

By establishing a hotline to the case manager we attempted to streamline the paper flow. The goal was that the general practitioner should be able to supply his patient with a date and time for an appointment for further examination at the ENT-department already at the primary consultation. The "pre-booked" slots for this patient group were organized, so that the primary appointment was most often within one to three days. In order of being able to book the full and relevant clinical work up immediately, with all examinations following each other without unnecessary waiting time, formal agreements with departments of neuroradiology and pathology resulted in high priority for the head and neck cancer patients at both departments.

The clinical work-up and treatment of head and neck cancer requires expert knowledge from many specialities [15]. Before the start of this project, only patients with oral cancer were seen at a multidisciplinary board. The tumor board was extended to include all head and neck cancer patients as a consequence of this pilot-project. We then expected to obtain an early and well-founded treatment planning without delay due to communication in writing in between departments. This multidisciplinary tumor board was introduced from January 2007. During the period of the project we upgraded the conference from once to twice weekly in order to facilitate further acceleration.

Quantifying the effect of established initiatives

The project period was 1 January 2007 to 31 December 2007. We used October-December of 2006 as period for comparison. Patients expected to go through an accelerated clinical course were consecutively registered and also identified retrospectively through examination of patient-lists from the outpatient clinic at the ENT Department, Aarhus Hospital, records from the pathology-department, Aarhus Hospital (diagnose of carcinoma of head and neck, excluding thyroid carcinoma) and the DAHANCAdatabase. They represented a broad specter of head and neck malignancies, excluding thyroid carcinoma, which has a separate program for clinical work-up. The reference group from the October-December of 2006 was made up of patients receiving a diagnosis of head and neck carcinoma and whom had had their clinical work up on the ENT-department at Aarhus Hospital. Patients were not included if their clinical program on the center had not been initialized within



Intervals in the clinical programme

Figure 1. Recorded intervals in the project. Interval 1 (referral) was the time from first visit at GP to first visit at ENT department, interval 2 (work-up) was included time for biopsy and imaging, interval 3 (treatment) was waiting time to start surgery or radiotherapy and interval 4 (total) was the full course.

the period of the project or in case they were seen because of suspected recurrence within six month after primary treatment. Patients who needed medical work-up for concurrent disease on other departments before initiation of head and neck cancer work-up were not included. Time intervals in the course of the patients were described by registration of relevant key-dates and only for those patients relevant to the specific interval (Figure 1). All intervals in the following and in the figures are reported as the median time in calendar days, i.e. weekends and holidays are included. Statistics were done in SPSS 13.0. Statistical tests were calculated with a nonparametric Mann-Whitney, two tailed test for nonparametric data, with a p-value < 0.05 considered the level of significance.

Results

A total of 446 patients were registered. The distribution throughout the period was described (see Table I). Of the 329 patients (74%), who had their clinical work-up fully or partly done on the ENT-department in Aarhus, 181 patients (55%) received a diagnosis of carcinoma. Of the 446 patients 117 patients (26%) had their clinical work-up done elsewhere. These patients were referred for further examination and final decision of treatment. Altogether 230 patients were candidates for primary therapy. The observed changes in the duration of the clinical programmes of the patients throughout the period of the project were described (see Figure 2). Waiting time until first contact on the head and neck oncology center (interval 1) was calculated for all patients referred for either clinical

Table I.	Patients	recorded	on	the	project.
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	Oct-Dec 2006 n (%)	Jan-Mar 2007 n (%)	Apr-Jun 2007 n (%)	Jul-Sep 2007 n (%)	Oct-Dec 2007 n (%)	Total period n (%)
Registered patients (pt.s)	48 (11)	73 (16)	96 (22)	102 (23)	127 (28)	446 (100)
Pt.s for clinical work-up on the ENT dept., Aarhus Hospital	34 (10)	56 (17)	71 (22)	77 (23)	91 (28)	329 (100)
Pt.s with a diagnosis of carcinoma and clinical work-up at the ENT dept., Aarhus Hospital	34 (19)	25 (14)	42 (23)	33 (18)	47 (26)	181 (100)
Pt.s referred for curatively intended therapy (PCIT)	42 (18)	31 (13)	45 (20)	45 (20)	67 (29)	230 (100)
Pt.s referred for PCIT on a surgical dept.	22 (19)	16 (14)	24 (21)	20 (17)	34 (29)	116 (100)
Pt.s referred for PCIT on a surgical dept., clinical work-up on the ENT dept., Aarhus Hospital	11 (18)	7 (11)	14 (23)	10 (16)	20 (32)	62 (100)
Pt.s reffered for PCIT on dept. of Oncology, Aarhus Hospital	20 (18)	15 (13)	21 (18)	25 (22)	33 (29)	114 (100)
Pt.s reffered for PCIT on dept. of Oncology, clinical work-up on the ENT dept., Aarhus Hospital	17 (21)	11 (14)	16 (20)	16 (20)	20 (25)	80 (100)



Figure 2. Histograms showing the median intervals for the reference period (Oct–Dec 2006) and the four quarters of the 2007 study year. Error bars are indicating the upper 90 percentile for waiting time.

work-up or treatment planning (n = 442, four cases)with missing key-dates). We demonstrated a gradual reduction in median waiting time until first contact from eight days in the October-December of 2006 to two days ultimo 2007 (p < 0.0001). The median time interval from the first contact at the head and neck oncology center and until the relevant treatment could be decided (interval 2), was calculated for all patients who had their clinical work-up performed partly or fully on the oncology center in Aarhus (n = 142). The median of this interval was reduced from 21 days in the reference period to nine days ultimo 2007 (p < 0.0001). The waiting time from referral to definitive treatment and until the treatment was initiated (interval 3), was analyzed for patients who were referred to curatively intended treatment (n = 227, three cases with missing keydates). The median of this interval was reduced from 26 to 15 days with the majority of reduction obtained in October–December of 2007 (p < 0.001). The median of the waiting time for surgical treatment remained stable at 14 days with a minor increase during the summer holidays, whereas there was a significant reduction from 42 to 17 days for the waiting time for radiotherapy (p < 0.0001). Interval 4 was calculated for patients who received a diagnosis of carcinoma of the head and neck after clinical work-up at the oncology center in Aarhus and whom where referred for curatively intended therapy (n = 138, four cases with missing key-dates). Overall, the full course (interval 4) was reduced from 57 days ultimo 2006 to 29 days ultimo 2007 (p < 0.001). Figure 3 illustrates the overall development throughout the period of the project for this group of patients.

Discussion

This project has shown that through a systematic reorganization and with the supply of limited extra resources it has been possible to reduce the time course from the suspicion of head and neck cancer and until treatment from 57 days to 29 days.

The problem of prolonged waiting time is widely acknowledged, and the existing data have recently been reviewed by Chen et al. [16]. According to their meta-analysis, the relative increased risk of death per month of waiting is 1.16 (95% CI: 1.02–1.32). Several head and neck oncology centres have tried to minimize the problem [17-21]. Throughout the 1990s



Figure 3. Cumulative histogram showing median intervals for the reference period (Oct–Dec 2006) and the four quarters of the 2007 study year.

a number of centralization and organizational initiatives were established in Stockholm, which brought along internal acceleration of especially the time to initiation of surgical therapy in relation to time of diagnosis. But at the same time, the waiting time for first visit at the oncology center and the clinical work-up was prolonged to an extend, so that the overall time course of the patient was increased despite an effort of achieving the opposite [17]. This example underlines the relevance of looking at the entire time course of the patient as a continuum of more intervals, and that all intervals need attention if an overall acceleration is the aim. In the presented project from Aarhus University Hospital we attempted to include both the primary and the secondary sector of the health care system in the effort of embracing the care coordination with the most widespread approach. The project has proved that a reduction of the waiting time is possible. The significant reduction in the waiting time for the first examination on the ENT department was primarily obtained due to the synergism of establishment of pre-booked slots in the outpatient clinic and the establishment of a case manager function, which ensured a more optimal planning for each patient and a more direct contact between the primary sector and the hospital. The physicians in the primary sector were thoroughly informed about the initiatives, which might also explain the increase in patients referred throughout the project period. Prebooked slots in the outpatient clinic involve risk of unused capacity. Nevertheless, after adjustments according to the needs, we registered only a minimal number of wasted time slots, as these slots were used for other patients on a waiting list, not in suspicion of cancer. In this project we chose an experienced nurse from the ENT Department as case manager. Her profound professional knowledge was of great importance in the overall coordination.

The reduction in the clinical work-up (interval 2) was obtained due to the "package solution" booking at the ENT Department and the significant reduction in waiting time for imaging procedures and pathology. The reduced waiting time for these procedures was enabled by giving higher priority to patients with suspicion of head and neck cancer as compared to patients with benign indications. Whether this resulted in increased waiting time for other patient groups was a concern, but it was not possible to monitor the time course of these patients in the current project.

Waiting time for surgical treatment (interval 3) was 14 days both in the reference period in 2006 and throughout the period of the project. This is possibly explained by the fact that the capacity was determined by available head and neck surgeons which was not changed. The waiting time for radiotherapy was, on the other hand, significantly reduced. This reduction was due to higher priority to head and neck cancer in the radiotherapy department, and a more efficient collaboration using the multidisciplinary tumor board for fast decision making.

Since the initiation of this project the DAHANCA has - in collaboration with the Danish National Board of Health - prepared national guidelines for disease management programmes for head and neck cancer, characterized by not accepting waiting time during the clinical work-up [22]. These guidelines state, that in an optimal scenario, the patient ought to be seen in the outpatient clinic within one working day, the clinical work-up should be finished within seven working days and initiation of treatment should be within the next seven to eight working days depending on modality, i.e. a full clinical program within 15-16 working days or about 21 calendar days. The initial results from the DAHANCA experience is currently being analyzed, but such a goal should be realistic, given that in the present pilot project it was possible to reduce the median time with four weeks from 57 to 29 calendar days without major investments.

Conclusion

The current project has shown that it is possible to reduce waiting times in head and neck cancer. Through logistic changes, employment of a full-time case manager, strengthening the multidisciplinary tumor board and giving higher priority for head and neck cancer patients, the overall time from first suspicion of cancer until treatment start was reduced from 57 calendar days to 29 calendar days.

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