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Cancer Patient Pathways shortens waiting times and accelerates the diagnostic process of suspected sarcoma patients in Denmark

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ABSTRACT

Cancer Patient Pathways (CPPs) for suspected cancer were implemented in Denmark to reduce waiting times for cancer diagnosis and treatment. Our study describes developments in time intervals and tumour size in a natural experiment before and after implementation of the CPP for sarcomas (January 1st, 2009). Medical files for patients referred with suspected sarcoma from other hospitals to Aarhus Sarcoma Centre during 2007–2010 ($n = 1126$) were reviewed for data on milestones, time intervals, performed diagnostics, and tumour size. Results showed a statistically significant reduction in median number of work days in the phase "referral to first appointment" for all patients. For bone sarcomas, median time was significantly reduced from 11 to five work days in the phase "first appointment to decision of treatment", for soft tissue sarcomas it was reduced from 28 to 18 work days in the phase "referral to start of treatment". Passive waiting time was reduced, and delays in the fast-track programme were caused mostly by supplementary diagnostics. Median tumour size for soft tissue sarcomas was reduced from 7.0 to 4.9 cm, possibly a secondary effect of increased awareness. CPPs have accelerated the diagnostic process for sarcomas, and our results may aid international development of similar initiatives.

1. Introduction

Sarcomas are rare, representing less than 1% of all newly diagnosed cancers; in Denmark approximately 300 new cases per year [1]. Clinical experience with sarcoma is thus sparse among primary care physicians and at primary hospitals, and treatment should be centralized to specialized sarcoma centres [2,3]. Denmark has two such centres, one in Copenhagen and one in Aarhus. Diagnosing sarcomas is difficult and patients may experience delay caused by misinterpretation of symptoms and lack of awareness among doctors [4]. Delayed cancer diagnosis is heavily debated, both publicly and among medical professionals. A literature review concluded that diagnostic delays in cancer do matter, but it is hard to quantify this in terms of effects on survival or mortality [5]. Another aspect is the patients' experience of delay where no systematic knowledge can

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be found. Studies on other cancer types indicate that time from symptom presentation to diagnosis and treatment has an effect on mortality and stage at treatment [6–8]. However, for sarcomas results are mixed. Studies show that long symptom duration may be associated with better survival, due to low grade tumours [9], with increased mortality [10], or may show no association with survival [11]. Attempts to reduce the diagnostic delay with implementation of guidelines for cancer diagnosis have had varied success, and problems reported include low compliance with guidelines and low awareness of symptoms [12–15]. In Denmark, National Cancer Plans have been introduced in recent years, and a large number of reports and scientific data [16] on delays in cancer diagnosis have been heavily debated in the Danish press. This has resulted in implementation of fast-track programmes (Cancer Patient Pathways (CPPs)), with recommendations for the standard patient's ideal pathway from clinical suspicion of cancer through justified suspicion, diagnostic procedures and final treatment. The objective is to minimize passive waiting time, and only accept delays with academically justified explanations. A clinical coordinator is included in the programme to optimize logistics. Development and implementation of CPPs are described in further detail by Probst et al. [17]. Thus, the CPPs are unique translations of a political demand for faster diagnosis and treatment of cancer patients into organizational management programmes describing agreed diagnostic procedures and time intervals between defined milestones. The initiative was backed by massive political consensus and economical support. The purpose of this study was to investigate this natural experiment analysing the changes in time intervals for suspected sarcoma patients before and after implementation of CPPs. We also wished to examine whether CPPs had an indirect effect on tumour size, as a secondary outcome.

2. Materials and methods

2.1. The Cancer Patient Pathway for sarcomas

When the general practitioner has a suspicion of sarcoma, the patient should be referred immediately to the local orthopaedic hospital for a clinical examination, conventional radiographs and a Magnetic Resonance Imaging (MRI) scan of the tumour to clarify whether the suspicion can be justified by a finding of radiological changes indicative of malignancy. When a suspicion is found to be justified, the patient should be referred immediately to the CPP-programme in one of the two Danish sarcoma centres, to which all treatment of bone and soft tissue sarcomas is centralized. The CPP for sarcomas was introduced on the 1st of January 2009, and defines alarm symptoms, milestones and time limits (measured in work days) of the diagnostic programme. The following specific alarm symptoms and clinical findings of a sarcoma defined in the CPP: soft tissue tumour >5 centimetres, soft tissue tumour on or profound of the deep fascia, palpable bone tumour, deep persisting bone pains, fast growing soft tissue tumour. Milestones defined in the CPP are the day the referral is received from the local orthopaedic hospital (Time point A, see Fig. 1), the first appointment in the centre (Time point B), decision of treatment (Time point C) and start of treatment (Time point E). The day of received referral is classified as day zero. The time limit for the referral phase (A–B) is five work days, and the patient should be seen for first appointment in the centre (Time point B) on day six. The diagnostic phase (B–C) has a time limit of nine work days for soft tissue tumours, and 18 work days for bone tumours, as bone tissue biopsies have to be decalcified before microscopic evaluation. Time limits for the treatment phase (C–E) are ten work days for operation, eight work days for chemotherapy and eleven workdays for radiotherapy. Thus the time limit for the overall phase (A–E) ranges from 22 to 34 work days depending on the tissue type and choice of treatment.

2.2. Study population

Aarhus Sarcoma Centre is a subdivision of the Department of Orthopaedic Surgery, at Aarhus University Hospital (AUH) in Denmark, and handles all referrals for bone and soft tissue sarcomas (except for retroperitoneal and ear nose and throat tumours) from the area of western Denmark (approx. 2.5 million inhabitants). The Sarcoma Centre also functions as a local hospital for Aarhus County. We included all patients referred to the CPP from hospitals outside Aarhus County to the Aarhus Sarcoma Centre with a suspicion of sarcoma, in the period from 01.01.2007 to 31.12.2010. Thus, our study population includes all suspected sarcoma patients from the geographical area of Jutland (western Denmark), except for Aarhus county. Patients referred from private hospitals outside of Aarhus County without an MRI-scan do not enter the CPP and are also considered as referred from Aarhus County. A patient was considered as referred with a justified suspicion of sarcoma if malignancy, cancer or sarcoma was mentioned in the referral text, MRI-description, or both; or the referral concerned an already histologically verified sarcoma. To be sure to include all patients with a justified suspicion of sarcoma in the period we looked through all referrals from hospitals outside Aarhus County to the department and patients referred with benign conditions or histologically verified types of cancer different from sarcoma, borderline tumours, aggressive fibromatosis, or giant cell tumours of the bone were classified as non-sarcoma referrals and excluded. Patients living in Aarhus County and patients referred without MRI from private hospitals outside of Aarhus County receive the MRI-scan and clinical examination at the sarcoma centre, and the suspicion is then justified or removed. If the suspicion is justified, they follow the same diagnostic programme as patients included in the CPP.

2.3. Patient identification

We identified our study population based on an extract from the Sarcoma Centre's electronic patient administrative system containing all patients registered as referred to the centre in the period from 01.01.2007 to 31.12.2010 (two years before and two years after implementation of the CPP for sarcomas). In total, 4726 patients were identified. We excluded 1824 (38.6%) patients referred directly from their general practitioner to the Aarhus Sarcoma Centre, 773