

POLICY REPORT

A novel model for a hub-and-spoke spinal service and improvements in the treatment of spinal pathology in a rural hospital setting

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ABSTRACT:

Introduction: We present a unique pathway for care aimed specifically at spinal patients. As a result of the shift of the spoke direction from the existing hub-and-spoke model, patient care is being redirected successfully with great benefit to a rural department. Within the rural community, it is the spoke that is the main locality to which patients present and at which they are treated. Subspecialty procurement is often more central and located in tertiary referral centres outside of a rural position. This in itself can prove difficult to patients and their relatives because subspecialty treatment, when required, is often only accessed at tertiary referral centers, which can present travel difficulties to patients and their relatives. This is at a time of great vulnerability for patients and families when what is required is more stability and familiarity.

Methods: We conducted a retrospective cohort study between 15 December 2014 and 21 September 2016. We examined the number of patients that had been seen and treated in both an inpatient and outpatient setting after a change of departmental policy and the introduction of two designated spinal consultants into a rural trauma and orthopaedic hospital in the county of Suffolk in eastern England. Before this introduction, patients were transferred out from this rural setting where inpatient management was required and/or seen in outpatient departments in more central (hub) locations. Over this time, 1413 patients were seen on an elective basis by two spinal consultants and 199 by one of those consultants on an emergency basis.

Results: This has led to a fruitful integration of spinal care in the rural hospital setting with the introduction of a first-line on-call service, specialist spinal onsite support with commissioned outpatient and trauma facilities, thereby increasing the facilities in the rural hospital setting on a background of continued support from the hub specialist centre.

Conclusions: This novel approach improves support for existing trauma and orthopaedic surgery departments, increases

commissioned facilities within the rural hospital setting and improves the care received on a more local level by patients developing spinal pathologies. This subspecialty service was previously only available within the more central, large city-based hub hospital. After the introduction of a subspecialty spine service, facilities within this spoke rural hospital have increased and access to these services is more available locally to the rural community. This has improved patient care dramatically.

KEYWORDS:

hub and spoke, spine, tertiary referral centre, United Kingdom

FULL ARTICLE:

Introduction

Rural district general hospitals have often struggled to provide appropriate levels of service for patients requiring care for spinal disorders who live in the surrounding areas they serve; this led to the creation of the hub-and-spoke model. Networks linking primary, secondary and tertiary care were developed by multiple healthcare providers to provide sufficient support for the local population. The model created has been one of fee-for-service reimbursement whereby patients are transferred from lower acuity inpatient or outpatient settings to larger, more comprehensive, tertiary centres. This has already been shown to be beneficial in the most rural of areas¹.

All healthcare providers must be accountable for the level of service they provide for patients. More recently, assumption of greater risk has become mandatory as has providing higher quality services at a lower cost in a more efficient fashion. This fee-for-service reimbursement has been associated with significant gaps financially and within the scale of care that has been provided. As healthcare providers must be more accountable for the services they provide, a more fully integrated district general hospital permits better planning and facilities in order to provide more specialist levels of treatment and offers true accountability and improved patient outcomes. Here, we demonstrate the improved service that is provided for patients and is an argument for putting the spoke before the hub. Its successful implementation is already well documented^{2,3}.

Methods

The pathways taken by patients with conditions warranting input from orthopaedic surgeons with a subspecialty spinal interest were examined before and after the introduction of locally based spinal consultants and a partnership with a specific spinal unit in Ipswich Hospital in the county of Suffolk in eastern England. Prior to 2014, consultants locally at Broomfield Hospital without a spinal support service managed patients presenting with spinal trauma. These patients would be discussed with a neighbouring hospital with neurosurgical cover.

Patients were admitted under the care of the on-call orthopaedic consultant at Broomfield Hospital. A designated spinal consultant was not available, although outpatient spinal clinics were held intermittently, which provided ad hoc discussion. If a local spinal opinion was not available, an opinion was sought from a neighbouring neurosurgical unit, although images were reviewed only. Discussion with the local neurosurgical team was often protracted, with a return opinion delayed. The care of acute spinal injuries provided a forum for remote direction to be coordinated; however, longer term conditions proved more difficult. Frequent delay occurred in those requiring patient transfer due to a lack of a specific contact point.

A specific relationship, policy change and partnership was introduced between Broomfield Hospital and Ipswich Hospital with designated, locally based spinal consultants. The aim of this approach was to provide a structured and holistic approach to the spinal patient with clearly defined protocols and locally based spinal opinions.

This introduction permitted the specific management of patients presenting with spinal injuries, infections and tumours to be directed with designated representation of spinal consultants at the daily trauma meeting. Ward assessment and examination of these patients was then permitted to be performed by designated spinal consultants. Patients were admitted under the care of the spinal consultants if required or specific protocols for guidance given to the orthopaedic teams with introduction of greater availability of spinal MRI, spinal orientated physiotherapy, spinal equipment and outpatient management.

An observational, retrospective cohort study was performed between 15 December 2014 and 21 September 2016; this coincided with the introduction of a designated spinal service to a rural hospital and a change in hospital and regional policy. Details of all patients who had been treated by the department during this time period were examined. The number of patients seen and treated specifically by the newly introduced spinal service were subcategorised and their details examined. We then examined the number of patients who would have been previously treated distantly from the rural hospital spoke setting and seen in a larger, city-based and centrally based hub service.

Results

A vast improvement in the care received by patients presenting with spinal conditions was seen. Prior to introduction of the designated spinal service, delays in expert spinal opinions were often seen in combination with an absence of a designated spinal contact. These issues were remedied with introduction of designated onsite spinal consultants and concrete relationships formed with a subspecialty spinal unit at Ipswich Hospital. If patient transfer was mandated, this was done via blue light ambulance from Broomfield Hospital to Ipswich after senior spinal consultant input from both units.

Specific guidelines were created for the spinal referral pathway for referrals made to Ipswich Hospital, and contact details were readily available. Guidelines for the early acute management in adults with spinal cord injury was created, as a clinical practice guide for the first stage of spinal injury. The management of conditions such as discitis was optimised with the creation of a specific treatment pathway from the initial presentation, with the introduction of algorithms such as the spinal myeloma working group pathway for the multidisciplinary approach to care. Bowel management following spinal surgery was also introduced after guidance with the National Spinal Injuries Centre for Stoke Mandeville was sought.

The management of non-urgent spinal cases has also been vastly improved. The spinal triage and multidisciplinary pathway has provided a specific framework for spinal referral triage. Inpatient or community referrals are directed into the spinal service more readily so as not to flood spinal outpatient departments.

Between the dates of 15 December 2014 and 21 September 2016, 199 patients were seen and treated at the spoke service on an emergency basis by a single consultant and 1413 by two consultants on an elective outpatient basis. In total, 1612 patients that would have had their care previously directed, treated and seen by a central, city hub service distant from a rural environment were treated in the rural environment between the dates examined. One patient, prior to introduction of the rural spine service, was transferred approximately 430 km away from the spoke service to a different location.

Discussion

Expansion of outpatient services

As advances in medical technology occur, less invasive yet successful procedures permit secondary care facilities to become more integrated within the original hub-and-spoke care model. This advancement of technology heralds greater patient choice. In order to maintain and adequately treat their patient population, local healthcare providers are expected to deliver expanded services in a time-sensitive, high-quality and efficient manner across all points of care⁴. This is something our department has experienced first hand and observed improved patient care and experience of the health system.

The new hub-and-spoke model that we advocate and have implemented in our unit mirrors the base structure seen within the traditional hub-and-spoke concept with primary, secondary and tertiary care settings working together within a network, but there is a fundamental change. The intended direction of patient flow within the care network has reversed. The focus is for more specialist spinal care to be delivered in district general hospital settings. This can come in the form of the outpatient setting, where costs can be reduced, access can be increased and preventative and post-acute care can be administered in a more efficient manner. In addition to this, first-line, on-call service with specialist support within normal working hours is provided with 24-hour support for 365 days a year from a single tertiary service unit.

Ambulatory care

The addition of ambulatory care is an interesting one and it will play an increasingly central role in the new model. More and more surgical procedures will be able to be performed at ambulatory care units, which will further reduce cost and improve patient convenience and healthcare experience. It can be seen as a way to not only enhance care delivery and manage costs but also bring with it more accomplished physicians. These units may one day themselves become the essential components of the integrated delivery system, bringing more convenient subspecialty spinal treatment. The model has also been used successfully in those with critical care needs⁵.

Conclusions

We present a novel approach to the hub-and-spoke service that is unique in its ability to treat spinal patients at a local centre whilst being able to accept patients back to the hub service for continued followup and care. In this manner, patients can be treated directly at a more local environment and, if required, be transferred to a more specialised spinal unit and be accepted back for more local followup and care. We advocate the use of this model not only for improved patient care but also to increase the services available to local units. The hub-and-spoke idea is for a highly specialised spinal service; our model permits specialist commissioned outpatient and trauma services and increase facilities in more local centres, with an in-hours trauma and elective service and referral to a specialist spinal unit

during on-call hours. We have presented evidence that regional policy change can improve patient care and the services that are available in the rural hospital setting. Prior to the policy introduction, hundreds of patients presenting to their rural hospital were transferred as an inpatient or had outpatient appointments at a distant and inconvenient centrally placed city location.

Whilst we appreciate that many confounding factors exist in the successful implementation of this model in our unit, we argue that the principles are generalisable to other rural units. Our previous experience of the treatment of spinal patients is not unique, with the hub-and-spoke model reaching international implementation. The introduction of two spinal consultants led to a cascading improvement of the treatment of spinal patients and the introduction of more focused facilities of care, which were previously only available at more central locations. Links to the hub service were maintained and in fact improved as the referral load was reduced. Our policy change led to improved continuity for patients and their families and improved services to the rural community, which has led to improved patient care.

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