

Post Operative Complications in a Dedicated Elective Orthopaedic Hospital: Transfers Requiring Specialist Critical Care Support

Abstract:

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Abstract

We aim to report our experience with out of hospital transfers for postoperative complications in a stand-alone elective orthopaedic hospital. We aim to describe the cohort of patients transferred, the rate of transfer and assess the risk factors for transfer. Patients were identified who were transferred out of the hospital to another acute hospital for management of non-routine medical problems. Patient data was collected relating to age, BMI, ASA, type of surgery, nature of the complication, timing and the outcome of transfer. In 2012, 2,853 inpatient surgical procedures were carried out, 51 patients (1.8%) developed a postoperative complication that required out of hospital transfer. Mean age of patients transferred was 67 (12-86) years, mean age of the overall case mix 58 years (0-96) ($p=0.01$). 37.7% of the overall case mix of surgeries was made up of primary hip and knee arthroplasty procedures, these patients made up 63.7% of patients transferred out ($p=0.001$). Mean BMI recorded was 31.7 (22-48) compared to the mean BMI of the total arthroplasty case mix of 28.8 (20-44) ($p=0.02$). 59% of all patients at our institution were ASA category II or III. 76% of patients transferred were ASA category II or III ($p=0.005$). We can conclude that patients requiring transfer are typically older. Arthroplasty patients are more likely to require transfer than patients undergoing other orthopaedic procedures. Among the arthroplasty cohort transferred patients will typically have a higher BMI than average. Patients with ASA category II or III make up nearly three quarters of those patients transferred. The mean age of patients transferred is typically older by 9 years.

Introduction

For traditional reasons throughout the UK and Ireland dedicated elective orthopaedic surgical units have traditionally existed as stand-alone units, separate from acute hospitals, often on a separate site. Such separation or ring fencing of elective surgical services has been shown to be advantageous in terms of reduced rates of surgical site infection^{1,2} as well as improved productivity³. There remains a number of inherent disadvantages however associated with these separate units. Limitations may arise in the delivery of high dependency care, imaging facilities and specialist nursing for example. These limitations can be especially pronounced where the unit is on a separate site. In particular where postoperative complications require specialist critical care support, out of hospital transfer will be required. At our institution in 2012, 2,853 inpatient surgical procedures were carried out. Anaesthetic cover is provided from Monday to Friday on a nine to five basis with a four bed high dependency unit. Out of hours medical and orthopaedic cover for HDU and all wards is provided by an in-house orthopaedic registrar. We aim to report here our experience with out of hospital transfers for postoperative complications in a stand-alone elective orthopaedic hospital. We aim to describe the cohort of patients transferred, the rate of transfer and assess the risk factors for transfer.

Methods

A retrospective review of all postoperative complications recorded at our institution for the year 2012 was carried out. A number of sources for data are available. A prospective database of all surgical complications is maintained and followed up by a dedicated clinical nurse specialist and this was reviewed for the study. The Hospital In-Patient Enquiry (HIPE) database and the hospital electronic clinical records system were also reviewed. Patients were identified who were transferred out of the hospital to another acute hospital for management of non-routine medical problems. A chart review of all patients who were identified as having been transferred out of the hospital was carried out. Patients were individually followed up and the receiving institutions contacted in order to determine the ultimate outcome of the patient transfer. Only patients who developed postoperative or perioperative complications were included in the study. Patients undergoing rehabilitation at the hospital were excluded. Complications were defined as any deviation from the normal postoperative course as described by Dindo et al^{4,5}.

Patient data was collected relating to age, BMI, American Society of Anesthesiologists (ASA) Physical Status Classification System category, the type of surgery, the nature of the complication, the timing of the complication, the day of the week of transfer, the outcome of the transfer. This data was further compared to data and patient demographics relating to the overall case mix of surgeries carried out at the hospital. Statistical analysis was carried out using SPSS

software (v16.0, IBM Corporation).

Results

In 2012 a total of 2,853 inpatient surgical procedures were carried out at our centre. 51 patients (1.8%) developed a postoperative complication that required out of hospital transfer. The mean age of patients transferred was 67 (12-86) years compared to the mean age of the overall case mix of 58 years (0-96) ($p=0.01$). A breakdown by systems affected is shown in Figure 1. The most common reason for transfer arose where there was a clinical suspicion for a pulmonary embolism. 17 patients were transferred for this reason. More than 50% of transfers took place on Friday, Saturday or Sunday. The mean time of transfer post op was 4.1 days (0-48). Figure 2 demonstrates the overall make-up of the inpatient case mix by surgery type at our institution over 2012 compared to the make up by surgery type of patients transferred. Where 37.7% of the overall case mix of surgeries was made up of primary hip and knee arthroplasty procedures, these procedures made up 63.7% of patients transferred out ($p=0.001$). A similarly significant difference exists comparing revision arthroplasty where 5.1% of the overall cases were revisions, 13.7% of the transfers were revisions ($p=0.002$). Of the group of arthroplasty patients transferred the mean BMI recorded was 31.7 (22-48), this compared to the mean BMI of the total arthroplasty patients treated at Cappagh 28.8 (20-44) ($p=0.02$). An analysis of ASA categories revealed that 59% of all patients undergoing surgery at our institution were of ASA category II or III. 76% of patients transferred were ASA category II or III, a significantly higher proportion ($p=0.005$).

Discussion

This study aims to give some indications as to the rates, likely causes and risk factors related to out of hospital transfers for postoperative complications in a stand alone elective orthopaedic unit. We have demonstrated that at our institution the rate of out of hospital transfers for postoperative complications for the year 2012 was 1.8%. This compares favourably with similar rates of around 2% described by the Royal College of Surgeons of England for postoperative complications⁶. There is a move internationally towards ring fencing and separating elective surgical services from emergency and acute services^{7,8}. Where emergency and elective facilities are shared, studies have demonstrated high rates of surgical procedure cancellations⁹ and increased rates of surgical site infection and hospital acquired infections^{10,11}. Such ring fencing can take place on shared sites where independently viable wards have been demonstrated to have tangible benefits. It is common throughout the UK and Ireland for elective orthopaedic units to exist as stand alone institutions separated geographically from their associated acute institutions. The inherent disadvantage associated with this is that when postoperative complications arise, requiring higher-level specialist input, out of hospital transfer is required to an appropriate unit. The ultimate goal in delivering elective orthopaedic care will be optimal patient care, whether through a ring-fenced unit sharing a site with an acute hospital or whether through a unit geographically separated from specialist acute services. Appropriate patient selection and optimisation in the context of the facilities available is the key to successful outcomes and minimising

postoperative complications. To this end at our unit there exists a dedicated preoperative assessment process run by the department of anaesthetics. For each patient a risk evaluation can be carried out in order to anticipate the likelihood of complications. In particular we can determine, given these likely risks or otherwise and given the specialist acute facilities available, whether our institution is the most appropriate centre in which to carry out the procedure. Data reported from the Australian Incident Monitoring Study supports such a process, where one study⁹ found that 11% of 6,271 critical incidents following surgery were attributable to inadequate preoperative evaluation⁹.

We can conclude from this study that patients requiring transfer are typically older. Arthroplasty patients are more likely to require transfer than patients undergoing other orthopaedic procedures. Among the arthroplasty cohort transferred patients will typically have a higher BMI than average. Unsurprisingly, patients with ASA category II or III make up nearly three quarters of those patients transferred. Postoperative complications affecting the respiratory system account for the majority of reasons for transfer (42%). The mean age of patients transferred is typically older by 9 years than the mean age of the inpatient surgical cases cohort.

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