Orthopaedic trauma surgery performed by unsupervised and supervised trainees: complication rates compared

IA Harris, C Lin
Orthopaedic Department, Liverpool Hospital, Liverpool, New South Wales, Australia

ABSTRACT

Purpose. To compare the complication rates associated with orthopaedic trauma surgery performed by unsupervised and supervised trainees.

Methods. In our hospital, 6361 orthopaedic trauma operations were performed between 1 January 1998 and 31 December 2002. Data pertinent to the surgeon’s supervision and postoperative complications were collected. Elective operations were excluded, as consultants were almost always present. Complication rates ensuing in unsupervised and supervised groups were compared using the Chi squared test.

Results. Of 6361 orthopaedic trauma operations performed, 3754 (59%) were by unsupervised trainees of varying experience, whereas 2494 (39%) were by supervised trainees or consultants. In 113 (2%) of the operations, the supervision status was not recorded. The complication rate was significantly higher in the supervised than unsupervised group (5.3 vs 3.3%, $\chi^2=15$, df=1, p=0.0001).

Conclusion. The complication rate was not higher for operations performed by unsupervised trainees than those performed in the presence of a consultant.

Key words: complications; orthopedic procedures

INTRODUCTION

In our hospital, many orthopaedic trauma operations are performed by trainees, without consultant supervision. There is a perception that unsupervised trainees are responsible for higher complication rates and compromised patient care.\(^1\) Previous studies have demonstrated no increase in complications in operations performed by supervised trainees as opposed to consultants.\(^2,3\) We aimed to compare the complication rates associated with orthopaedic trauma surgery performed by unsupervised trainees with those ensuing in the presence of consultants.

MATERIALS AND METHODS

6361 orthopaedic trauma operations were performed

Data regarding the surgeon’s supervision and postoperative complications were collected. Elective operations were excluded, as consultants were almost always present. Complications were classified (by the department during monthly meetings) into 3 categories: treatment error, expected risk, and diagnostic error. Complication rates between the unsupervised and supervised groups were compared using the Chi squared test.

**RESULTS**

Of 6361 orthopaedic trauma operations performed, 3754 (59%) were by unsupervised trainees of varying experience, whereas 2494 (39%) were by supervised trainees or consultants. In 113 (2%) of the operations, the supervision status was not recorded or ambiguous. Over the 5-year period of the study, the extent of experience of the trainees did not differ significantly. The overall complication rate was 4.0% (254 complications); the number was significantly higher in the supervised than unsupervised group (131 vs 123, 5.3 vs 3.3%, \( \chi^2=15, df=1, p=0.0001 \), Table). In particular, treatment error (fixation failure and mal-reduction of fractures) was significantly more frequent in the supervised than unsupervised group (33 vs 18, 1.3 vs 0.5%, \( \chi^2=13.2, df=1, p<0.0003 \), Table). The complication rates over the 5-year period were similar.

**DISCUSSION**

Some studies have shown that there is no increased morbidity or mortality in supervised, trainee-led operations. The complication risk of coronary artery bypass surgery performed by either supervised trainees or consultants was similar.\(^6\) However, after adjusting for imbalances in prognostic factors, operations performed by supervised trainees had longer hospital stays and higher blood transfusion rates than those performed by consultants.\(^5\) Studies on thyroid surgery also found no significant increase in complication rates in supervised, trainee-led operations,\(^7,8\) except for a 15% increase in operating time.\(^7\) The effects of training and supervision on recurrence rates after inguinal hernia repair were not significantly different between consultants, unsupervised senior trainees, and supervised junior trainees.\(^2\) However, unsupervised junior trainees had an unacceptably high recurrence rate (relative risk=21). In a study on below-knee amputations, the revision and conversion rates were significantly higher in the unsupervised junior surgeons than senior surgeons.\(^3\) From these studies, it was concluded that surgery by unsupervised junior registrars may have resulted in higher complication rates in certain operations. However, another study reported that the level of supervision of trainees during operations does not seem to affect clinical outcomes adversely.\(^10\)

Our study differs from previous studies because of the high proportion of unsupervised surgery that covered a wide range of orthopaedic trauma with varying complexity. As consultants are present for most complex surgeries, the association between consultant supervision and increased complications may reflect this selection bias. We do not have a reliable method to measure case complexity to test this as a confounder. Further studies controlling for case complexity may provide more information regarding this association.

**CONCLUSION**

Although having consultant supervision is desirable, its benefit in terms of clinical outcomes was not shown in this study. Provision of supervision should take account of the complexity of surgery and seniority of the operating trainees. The results of trauma surgeries performed by unsupervised trainees are not worse than those performed by or under the supervision of consultants. Further research into the potential benefits of consultant supervision is indicated, and should be balanced against the costs involved.
REFERENCES