LONG-TERM OUTCOME AFTER REPAIR OF FRACTURED NECK OF FEMUR
Comparison of subarachnoid and general anaesthesia
P. J. MCKENZIE, H. Y. WISHART AND G. SMITH

SUMMARY
One hundred and forty-eight patients undergoing "pin-and-plate" repair of fractured neck of femur received either subarachnoid blockade or general anaesthesia. The patients were followed up for 1 year after surgery. At the end of the year, 34% had died and 50% had returned home. Twelve per cent were either in hospital or in institutional care; 4% were lost to follow up. The mean duration of acute plus convalescent hospital bed occupancy was 84.4 days. There was a significantly lower mortality in the subarachnoid anaesthetic group by 14 days after surgery. The majority of the deaths in the general anaesthetic group were clustered between 6 and 16 days. However, at the end of 2 months the mortality rates were similar in both groups. It is conceivable that the difference in the distribution of deaths between the groups was a result of thrombo-embolism.

Mortality after surgical repair of hip fracture may be decreased if regional anaesthesia (subarachnoid blockade) is administered instead of general anaesthesia (McLaren, Stockwell and Reid, 1978). However, this observation is controversial since the numbers studied by these workers were small and the period of follow-up comparatively short. Wickstrom, Holmberg and Stefansson (1982) found no difference in outcome between five anaesthetic techniques but, once again, the numbers in each group were small although the period of follow-up was much longer.

We report the outcome in 148 patients studied over a period of 1 year after receiving either general or subarachnoid anaesthesia. Information was collected regarding their health, and about the extent to which they placed demands on health care resources.

PATIENTS AND METHODS

Patients
One hundred and fifty patients undergoing surgical correction of a fractured neck of femur (Honey-Capener nail/plate, KY nail or J.T.B. nail/plate) at the Western Infirmary, Glasgow, were allocated randomly to receive subarachnoid spinal block or general anaesthesia. All received an infusion of crystalloid fluid i.v. for a minimum of 12 h before operation, to minimize the problem of dehydration which is common in such patients. Although many of the patients suffered from medical problems common to their age group, it was rare for these to result in postponement of the operation. Over the period of the study, operation was postponed in only two patients (not included in the 150) (because of gross anaemia and gross hypokalaemia). No formal premedication was given although analgesic drugs had been administered as required. The anaesthetics were administered by P. McK. and H.Y.W.

Anaesthesia

General anaesthesia group (75 patients). Anaesthesia was induced with Althesin 1–3 ml i.v. Suxamethonium 50 mg was given to facilitate tracheal intubation and anaesthesia was maintained with halothane 0.75–1.25% and 66% nitrous oxide in oxygen. The patients breathed spontaneously.

Subarachnoid anaesthesia group (73 patients). Hyperbaric 0.5% cinchocaine 1.3–1.5 ml was injected to the subarachnoid space using a 22-gauge needle at the L3–4 or L4–5 space, with the patient in a lateral horizontal position and with the fractured hip dependent. Following the injection the patient was returned to the supine horizontal position. In two patients the subarachnoid space could not be
identified and these patients received general anaesthesia and were excluded from the study.

Small doses of diazepam i.v. were given if sedation was required and one patient received metoclopramide for nausea.

Blood loss during surgery was estimated by the weighing of swabs and the measurement of suction losses. The duration of the operation was recorded. Each patient's postoperative course was followed closely by inspection of case notes and, subsequently, by questionnaires to general practitioners, convalescent homes, institutions and so on. Although the cause of death was sought, postmortem examinations are seldom undertaken in this age group and information is often sparse. Therefore we report only the suspected causes of death occurring in acute hospital in-patients. Differences in mortality rates at different time intervals were analysed by the Chi-square test with Yates' correction.

RESULTS

There were no statistically significant differences between the groups in respect of mean age, sex distribution, source of admission, duration of surgery, blood loss at operation, or interval between admission to hospital and operation (table I).

Table II lists the location of the patients or outcome at the end of 1 year. There was no important difference in the long-term outcome between the two groups. Including patients who died, the mean length of stay (±SEM) in the acute hospital was 42.9 (± 7.94) days for the general anaesthetic group and 38.8 (± 6.5) for the patients receiving subarachnoid blockade. The mean duration of all types of hospitalization was 82.9 days (±13.2) for the general anaesthetic group and 85.9 days (±13.3) for the subarachnoid group.

The cumulative percentage mortality in the first 8 weeks following operation is shown in figure 1. At 14 days after operation, cumulative mortality was significantly lower (P<0.05) in the subarachnoid group (4.2%) than in the general anaesthetic group (16%). Between days 6 and 16 there was a marked clustering of deaths in the general anaesthetic group which did not occur in the other group. However, by the end of 2 months there was no difference in mortality between the groups. The recorded causes of death (according to the hospital notes) in the first 28 days are listed in table III. While "pneumonia" is the main cause in the subarachnoid group, thrombotic or thrombo-embolic events were the probable main causes in the patients receiving general anaesthesia.

DISCUSSION

This study has demonstrated that the early mortality associated with surgical correction of fractured neck
The overall mortality at the end of the first year after surgery was higher in the present study (34.4%) than the 19.3% reported in a multi-centre study of 1503 patients with suspected fracture of the femur (Barnes et al., 1976). However, approximately 16% of patients were lost to follow-up in that study and, thus, the mortality may be an underestimate. The predicted annual mortality rate for a population of age and sex distribution similar to that of the present study is 9% (Scottish Home and Health Department Mortality Statistics, 1973). There was a striking and significant difference in mortality between the two groups by 14 days after surgery (fig. 1). Although the cause of this difference has not been studied in the present investigation, the timing of deaths in the general anaesthesia group might suggest a difference in the extent of thromboembolism between the two groups. Several recent studies have shown subarachnoid or extradural anaesthesia to be associated with a lower frequency of deep venous thrombosis when compared with general anaesthesia in patients undergoing total hip replacement (Thorburn, Louden and Vallance, 1980; Modig et al., 1981), open prostatectomy (Hendolin, Mattila and Poikolainen, 1981), and fractured neck of femur (Davis, Laurenson and Quince, 1980). However, the last study used the fibrinogen uptake test to detect deep vein thrombosis,—a method with a high false positive rate following hip surgery (Louden et al., 1978).

There are several possible mechanisms for these effects. Lower limb blood flow increases after
extradural anaesthesia (Modig et al., 1981), and decreases following the induction of general anaesthesia (Clark and Cotton, 1968). In a group of patients included in the present study, Drummond and colleagues (1980) showed a significant decrease in whole blood viscosity and increased red cell deformability after subarachnoid anaesthesia, and approximately the inverse effect after general anaesthesia. These changes could affect the liability to thrombotic events, and the adequacy of organ perfusion. Extradural anaesthesia produces less depression of fibrinolytic activity after operation (Modig et al., 1983), and systemically administered local anaesthetic agents have been demonstrated to decrease the frequency of deep venous thrombosis after operation (Cooke et al., 1977). In a recent study (Wickstrom, Holmberg and Stefansson, 1982), 169 female patients (aged 70 yr or more) were followed up for 4 years after surgery for fractured neck of femur. Five different anaesthetic methods were used, one of which was an extradural technique, but there were no important differences in mortality between techniques. In particular, there was no significant difference between the techniques within the first 4 weeks after surgery. Long-term survival was dependent mainly on the age of the patient and the type of fracture.

The present study re-emphasizes the problems of convalescence after surgery in the elderly with fractured neck of femur and the enormous burden placed upon health care resources. It appears that subarachnoid anaesthesia has no benefit over general anaesthesia in decreasing this burden.

ACKNOWLEDGEMENTS

The authors thank Professors Alastair Spence and Martin Vessey for their advice and encouragement, Dr Kilm McPherson for statistical advice, and Ms Carolyn Walker for secretarial assistance.

REFERENCES


DEVENIR A LONG TERME DES PATIENTS OPERES POUR FRACTURE DU COL DU FEMUR

Comparaison de l'anesthesie generale et de la rachianesthesie

RESUME

Cent quarante huit patients opérés pour fracture du col du fémur avec mise en place d'un "clou-plaque" ont reçu soit une rachianesthesie, soit une anesthesie generale. Les patients ont été suivis pendant un an après l'intervention. A la fin de l’année, 34% étaient morts et 50% étaient rentrés à la maison. Douze pour cent étaient soit à l'hôpital soit dans une institution; 4% étaient perdus de vue. La durée moyenne de l'hospitalisation en lit d'agli et de convalescence était de 84,4 jours. La mortalité était nettement plus basse dans le groupe qui avait reçu une rachianesthesie jusqu’au 14e jour après l'intervention. La plupart des morts observées dans le groupe avec anesthesie generale étaient survenues entre le 6e et le 16e jour. Cependant, au bout de 2 mois, le pourcentage de mortalité était le même dans les deux groupes. La difference de distribution des morts entre les groupes est probablement due à des complications thrombo-emboliques.
OUTCOME FOLLOWING FRACTURED NECK OF FEMUR

LANGZEITGEBNISSE NACH OPERATIONEN VON FEMURHALSFRAKTUREN

Vergleich zwischen Spinalanästhesie und Vollnarkose

ZUSAMMENFASSUNG


CONSECUENCIA A LARGO PLAXO DESPUES DE COUPOSTURA DE UNA FRACTURA DEL CUELLO DEL FEMUR

Comparación entre anestesia general y espinal

SUMARIO

Se administró ya sea una anestesia general ya sea una anestesia por bloqueo sub-aracnoideo a 148 pacientes sometidos a una compos- turura de "placa y clavo" del cuello de fémur con fractura. Se siguieron a los pacientes hasta 1 año después de la operación. Al fin de un año, un 34% habían muerto y un 50% habían vuelto a casa. Un 12% se encontraban ya sea en el hospital ya sea en una institución bajo cuidados; un 4% no pudo ser localizado. La duración promedio de ocupación de cama correspondiente a la fase aguda y a la fase de convalecencia era de 84,4 días. Se observó una mortalidad mucho más baja en el grupo con anestesia sub-aracnoidea en los 14 días siguientes a la operación. La mayoría de las muertes en el grupo con anestesia general fueron agrupadas entre el sexto y el 16avo días. Sin embargo, al fin de 2 meses, las tasas de mortalidad eran similares en ambos grupos. Es posible concebir que la diferencia en la distribución de los decesos entre los grupos resultaba de tromboembolia.