

MORTALITY IN FRACTURES OF THE FEMORAL NECK FOLLOWING TREATMENT

By P. C. N. Wong

(Department of Orthopaedic Surgery, University of Singapore)

INTRODUCTION

The special feature of femoral neck fractures is that it is mostly a problem of old age at a period of life when morbidity rates are high and mortality rate is almost a normal incident.

"In former years this fracture was a terminal event in the lives of these feeble and fragile individuals who died within 10 or 14 days from cardiac, pulmonary or renal complications, aggravated by the enforced recumbency and immobility that was so often permitted. But considerable advances have been made since then and it is now recognized that internal fixation of the fracture within the first few days after the injury is often vitally important in order to permit early mobilization and thus avoid the dangers of prolonged recumbency and immobility in senile patients." (Watson-Jones 1955)

In spite of specialized knowledge in the treatment of these injuries too great a proportion of these patients still succumb.

It is the object of this paper to discuss this problem as far as it concerns femoral neck fractures in Singapore.

PREVIOUS WORK

Alffram (1965) writes:

"In most data mortality refers to hospital mortality i.e. the number of deaths occurring in hospital (Reno and Burlington, 1958; Finney *et al* 1959; Manpel *et al*, 1961) and in fact most data indicate that most of the deaths usually occur within the first few weeks after the fracture and that life expectancy in fracture patients surviving 3 to 6 months was not appreciably less than that of the general population (Boyd and George, 1947; Kennedy *et al*, 1957; Fitts Jr. *et al*, 1959; Manpel *et al*, 1961). It would appear, therefore, that the calculation of hospital mortality is of greater value than mortality estimates 3 to 6 months after injury.

A higher mortality has been reported in trochanteric than with cervical fractures (Lindgren 1924; Wedeen *et al*, 1957; Fitts Jr. *et al*, 1959 and Evans 1960); others have been unable to confirm this (Reno and Burlington, 1958; Manpel *et al*, 1961).

Mortality of patients with fractures of the femoral neck particularly trochanteric fractures, has been reported higher in conservatively treated than operated cases (Cleveland *et al*, 1947. Banks and Quigley 1960; McGoe and Evans, 1960) others have reported mortality equal in these groups (Ibsen, 1951; Schank Jr. *et al*, 1956). Kennedy *et al* (1957) pointed out that "the age and general condition of patients were of more importance with regard to mortality than were type of fracture or method of treatment."

PRESENT STUDY

Material

Since 1952 all patients admitted to the accident and orthopaedic service of the Singapore General Hospital with fresh fractures of the proximal femur were assessed by surgeon, anaesthetist and physician with a view to operative fixation. The operation was carried out at the next operative session (twice weekly) but when necessary a few days were spent in preoperative medical care usually with benefit.

In the 5 years 1961 to 1965, 411 cervical fractures were treated of which 169 were men and 242 were women, 124 cases in men and 164 cases in women were treated surgically. Also treated were 510 trochanteric injuries of which 164 were women and 346 were men. 284 of the cases in men and 116 cases in women were treated surgically.

There were 51 deaths in the series (Table I).

MORTALITY IN RELATIONSHIP TO AGE, SEX AND TYPE OF FRACTURE

Of the 51 deaths 32 were men and 19 were women, all of whom occurred whilst the patients were still in hospital. The overall mortality rate is therefore 5.5%. In males however the mortality rate was 6.2% and in women it was 4.7%.

Mortality in both sexes was higher in those who sustained trochanteric fractures. The overall death rate in trochanteric fractures in males was 7.5% and in females this was 5.5%. In cervical fractures the overall death rate in women (4.1%) was a little higher than in men (3.6%).

TABLE I
MORTALITY RATE IN THE TREATMENT
OF FEMORAL NECK FRACTURES
1961-1965

Race	Trochanteric		Cervical	
	Males	Females	Males	Females
Chinese	20 (9)	8 (7)	6 (3)	8 (6)
Indian	4 (1)	—	—	2 (2)
Malay	2 (2)	—	—	—
Eurasian	—	1	—	—
European	—	—	—	—

(Figures in brackets non Operative Cases)

Deaths per 1000 proximal injuries rose progressively with age with those of the men exceeding those of the women (Table II).

TABLE II
DEATHS PER 1000 OF FRACTURES OF
PROXIMAL FEMUR

	Males	Females
<50	9	0
50—59	32	21
60—69	36	19
>70	119	88

MORTALITY RATE IN RELATIONSHIP TO TREATMENT

Death rate in those treated operatively was 3.0%. Women stood operation a little better than men for the post operative mortality rate in the former was 1.4% and in the latter it was 4.2%.

In trochanteric fractures the post operative death rate in men was 4.9% and in women it was 1.7%. Deaths following fixation of cervical fractures in men was double that of the women i.e. 2.4% and 1.2% respectively.

Non operative deaths totalled 30, 15 men and 15 women. The overall mortality rate in non operative cases was therefore 13%. In men it was higher than in women i.e. the respective rates were 14% and 12%. In trochanteric fractures the mortality rate in non operative cases in men was

19.4% and in women it was 16.7% and in cases of cervical fractures which were not operated upon the mortality rate in men was 7% and 10% in women. Of the 51 deaths 21 were virtually moribund on admission and were therefore beyond consideration for surgery. They succumbed during medical treatment.

The principal causes of death are listed in Table III. The main cause only is given, multiple contributory factors were usually present.

TABLE III

	Males	Females
1. Bronchopneumonia	12	9
2. Congestive Cardiac Failure	4	3
3. Shock and Haemorrhage	5	1
4. Coronary Occlusion	2	2
5. Cerebral Vascular Accident	3	—
6. Renal Failure	1	2
7. Toxis Absorption (Bed Sores)	2	—
8. Electrolyte Imbalance (Ileus, Diarrhoea)	1	1
9. Secondaries	1	1
10. Liver Failure	1	—
TOTAL	32	19

MORTALITY IN RELATIONSHIP TO TRAUMA

All the 51 patients who died sustained their injuries as a result of moderate trauma. This would infer that fractures sustained as a result of severe trauma occur more often in relatively healthy individuals. This would appear to coincide with the findings of Alffram (1964).

DISCUSSION

The overall mortality figure of 5.5% of fractures of the femoral neck in Singapore is low when compared with other published series which on an average is 18% (Table IV).

Although bronchopneumonia is the main cause of death in this series, the actual number is very much smaller than in comparable series from Europe. The obvious explanation for this is the clemency of the weather in Singapore as compared to the countries in Europe.

TABLE IV

Author	No. of Cases	Type of Fracture	Mortality
Spotoft 1944	512	C+T	17%
Jensenius 1956	1319	C	12
Wedeen 1957	938	C + T	11
Manpel <i>et al</i> 1961	478	C + T	31
Wong 1968	921	C + T	5.5

The low mortality after operative treatment, 4.4%, speaks eloquently for the belief in early fixation followed by early mobilization as a prophylaxis against the dangers of prolonged recumbency and immobilization.

No less than 123 cases (30%) of cervical and 110 (21.5%) trochanteric fractures come under the category of "cases treated by methods other than surgery." Cases which presented late (often months after the acute episode) constitute the bulk of these cases; a small number refused hospitalization, a small number of trochanteric fractures in young patients were initially treated by traction followed by immobilization in a hip spica. The remaining 30 cases presented as acute cases but were moribund on admission and were thus beyond consideration for surgery. Although this gives a 13% mortality figure for the group of "cases treated by methods other than surgery", it should not be taken as a mortality figure for cases treated by conservative means.

SUMMARY AND CONCLUSION

In a series of 951 fractures of the femoral neck treated over a 5 year period there was an overall mortality rate of 5.5%. Post operative mortality was 3% and cases treated by "methods other than operation" was 13%. These figures were low when compared with European figures.

Mortality in trochanteric fractures was greater than in cervical fractures.

Death rate increased with age.

The overall mortality rate for cervical fractures and the mortality rate for cervical fractures treated by "methods other than surgery" were both higher in women but in all others the rates were higher in men.

REFERENCES

1. Alffram, P. A.: "An Epidemiologic study of cervical and Trochanteric Fractures of the Femur in an Urban population Acta Orthop." Scand. (Suppl. 65) 1:1964.
2. Banks, H. and Quigley, H.: "Treatment of Fractures and Dislocations 1950-60." New Eng. J. Med. 263:447, 1960.
3. Boyd, A. B. and George, I.L.: "Complications of Fractures of the neck of the Femur." J. Bone Jt. Surg. 29: 13, 1947.
4. Cleveland, M., Bosworth, D., and Thompson, F.R.: "Inter-trochanteric Fractures of the Femur. A survey of treatment in traction and by internal fixation." J. Bone Jt. Surg. 29:1049, 1947.
5. Evans, E.M.: "Trochanteric Fractures." A review of 110 cases treated by nail plate fixation. J. Bone Jt. Surg. 33-B: 192, 1951.
6. Finney, D.W.C., Beverley, B.J. and Eaton, G.O.: "Fractures of the Hip." Amer. Surg. 25:8, 1959.
7. Fitts, N.T., Jr. Lehn, H.B., Schor, S., and Roberts, B.: "Life Expectancy after fracture of hip Surg." Gynae. Obstet. 108:7, 1959.
8. Ibsen, B.: "Necrosis capitis femoris post fractura colli femories veri et fractura pertrochanterica." Munksgaard, Copenhagen, 1951.
9. Jensenius, H.: "Osteo synthesis of medial fractures of the femoral neck." Acta chir. Scand. 111:322, 1956.
10. Kennedy, J.C., McFarlane, M., and McLachlin A.D.: "The Moe plate in intertrochanteric fractures of the femur." J. Bone Jt. Surg. 39-B:451, 1957.
11. Lindgren, U.: "The treatment of fractures of the femoral neck." Acts Chir. Scand. 57:55, 1924.
12. Manpel, J., Marzueli, V., and Baley, S.J.: "The fractured hip, a complication of Aging." Arch. Surg. (Chicago) 82:474, 1961.
13. Reno, J.H. and Burlington: "Fractures of the Hip mortality survey." Amer. J. Surg. 95:581, 1958.
14. Shank, W.F., Jr., Smith, R.G., and Stephens, J.G.: "The fractured Hip—a major surgical and socialogical problem." Am. J. Surg. 91:618, 1956.
15. Spotoft, J.: "Osteosynthesis colli femores." Munksgaard, Copenhagen, 1944.
16. Watson—Jones, R.: "Fractures and Joint Injuries." Vol. II. Fourth Ed. Livingstone Ltd., London, 1955.
17. Wedeen, R., Rosenthal, H., and Miller, P.: "Mortality statistics of hip fractures (1935-55)". J. Bone Jt. Surg. 39-A: 1218, 1957.