



CHAPTER II

LITERATURE REVIEW

Review and related literature

Instability is defined as the inability of a fracture to resist displacement after it has been manipulated into an anatomic position. The importance of anatomic reduction of Colles' fracture on the patient's functional result is clearly demonstrated^(10, 16, 17) especially for younger patients. In elderly patients, dorsal tilting of distal fragment up to 15 degrees can be accepted without effect on functional outcome.⁽¹⁸⁻²⁰⁾

Dorsal tilting of distal fragment is one of the common abnormal radiographic findings in healing Colles' fractures. During the immobilization period of the well reduced fracture, dorsal tilt of the distal fragment usually increases, especially in the first two weeks^(7, 13, 17) and reduces the successful rate of treatment over time.⁽²¹⁾ Mean of dorsal tilt angle changes from 0.93 degree immediate after reduction to 9.03 degrees at the time of the union.⁽²²⁾ The redisplacement of dorsal tilt angle occurs in about 60% of conservatively treated Colles' fractures at the end of the fifth week.⁽¹³⁾ Re-reduction and application of another cast cannot improve this type of redisplacement.^(10, 12) The successful alternative treatment for the unstable Colles' fracture is re-reduction and application of an external fixator.⁽²³⁾

Regarding to the fair and poor result of treatment groups, dorsal tilting of distal fragment is one of the three most common abnormal radiographic outcomes^(21, 24) Palmar angle was found to correlate with wrist functions such as, pain and grip strength.^(8, 17) Degree of wrist dysfunction corresponded with degree of dorsal tilt angle. Most studies demonstrated unfavorable wrist function score relating to more than 10 degrees^(10, 25, 26) of dorsal tilting of the distal fragment, but there are still some recent studies^(18, 20) that accept as high as 15 degrees of dorsal tilting of distal fragment. For more than 10 degrees of dorsal tilting, distal radioulnar joint congruency and radiocarpal joint stability are interfered with⁽¹²⁾, resulting in pain and limitation of wrist motion⁽²⁵⁾.

Various risk factors have been studied for an association with redisplacement of Colles' fracture.

Lafontaine (1989) suggested 5 factors that indicated instability⁽²⁷⁾

1. initial dorsal angulation greater than 20 degree
2. dorsal comminution
3. intra articular fracture
4. associate ulnar styloid fracture
5. age greater than 60 years

if any fracture had three or more factors out of five, that particular fracture was an unstable fracture.

Until now, there have been many articles supporting some risk factors such as initial dorsal tilting of distal fragment^(9, 21, 28), dorsal comminution^(15, 21, 29, 30), and age^(9, 19, 31, 32). But in the case of the controlled trial study of Nesbitt, he found no association between redisplacement of distal radius and initial dorsal tilting or dorsal comminution or associated ulnar fracture that is similar to the study of Roysam, 1993.⁽¹⁶⁾ He expressed his support only for the age of the patient as a risk factor.

Other than the suggestions of Lafontaine, there are other important risk factors. Gender of the patient seems to be one of the most interesting, and found to have strong association with redisplacement in many previous studies.^(19, 31) Radial shortening, a common abnormal finding in Colles' fracture, was reported as one of a risk factor.^(18, 28) The evidences showed that wrist deformity after Colles' fracture is somehow inevitable and reduces the patient's hand function. To prevent complications, an ability to predict the outcome at the beginning of treatment from known risk factors is the most important. The purpose of our study was to correlate the size of dorsal cortical bone defect, radioulnar index difference, patients' age and gender, to the amount of redisplacement of dorsal tilt angle of Colles' fracture. Radiographic indices used in our study, dorsal tilt angle and radioulnar index, are generally accepted with a high consistency.^(33, 34)