

## CHAPTER 1

### BACKGROUND AND RATIONALE



#### 1.1 Introduction

Chronic renal failure (CRF) is a common disease in Thailand. The causes of CRF are kidney diseases or other systemic diseases such as hypertension, diabetes mellitus (DM), gouty arthritis, etc. When the disease progresses to end state renal disease (ESRD), the function of kidney, in controlling normal homeostasis, and excretion of the waste products will impair. Patients with ESRD require chronic dialysis or kidney transplantation to prolong their life. There are two types of chronic dialysis, continuous ambulatory peritoneal dialysis (CAPD) and hemodialysis (HD).

Hemodialysis patients have to come to dialysis centers 2-3 periods per week. Each period lasts for 4-5 hours. In CAPD, the patients can easily change the dialysate fluid in and out of their abdominal cavities by themselves without staying in the hospital. Since there are limited numbers of hemodialysis machines in government hospitals, the number of CAPD patients increase every year. At the Bhumibol Adulyadej Hospital, the number of CAPD patients is about ten times the number of hemodialysis cases.

#### 1.2 Definition and Epidemiology of Peritonitis

Peritonitis is not only one of the most common complications of CAPD, but also the most common cause for hospitalization and discontinuation of CAPD (1,2). It influences mortality in peritoneal dialysis patients (3). The rate of peritonitis

is not uniform among CAPD patients. It varies from 0.54 - 1.7 episodes per year per patient (4-7). Some patients may have many episodes of peritonitis in one year, whereas some have no peritonitis during the first 10 years (8). Peritonitis is diagnosed if at least two of the following three criteria are met : abdominal pain, dialysate cell count of more than  $100 \text{ cell/mm}^3$  , and positive dialysate culture for organism.

### 1.3 Factors associated with the Rate of Peritonitis

Many factors have been reported to associate with the risk of peritonitis. These factors are age, black race , the presence of DM mellitus (DM) (9), student status, rental housing , substance abuse (10), educational level, and peritoneal dialysis system (11), immunosuppression (20), malnutrition (21), the presence of nasal carrier of *Staphylococcus aureus* (13,14), the causes of chronic renal failure (6), exit site infection (12), twin- bag system (2,15-18), Y set technique (19), and Luer lock with iodine instillation at the connecting site (1).

The factors which are widely accepted by many investigators to be the risk factors are exit site infection (12), nasal carrier of *Staphylococcus aureus* (13,14), immunosuppression (20), and malnutrition (21).

Factors which are accepted to minimize the rate of peritonitis are twin- bag system (2,15-18), Y set technique (19), and Luer lock with iodine instillation at the connecting site (1) .

Some factors are still not established whether they are the risk factors or not. They are causes of renal failure (6,22), the presence of DM (1,3,6,7,9,16, 23-25) , and age (1,5,9,25-28).

Indeed, the types of organisms which cause peritonitis and catheter infection are essentially importance. Staphylococci are the most common cause of

peritonitis in most studies. Staphylococci strains producing coagulase are designated *S.aureus*. The other group of staphylococci is coagulase-negative staphylococci. In this group, *S.epidermidis* and *S.saprophyticus* are the most clinical importance . Many studies have reported that, the most common cause of peritonitis is *S.epidermidis* (29-30). Several studies have found that, *S.aureus* is the major cause of catheter infection (12,30-37) and peritonitis (38,39). Catheter infection from *S.aureus* is found associated with *S.aureus* peritonitis (12,40,41). Both catheter infection and peritonitis are found correlated with the nasal carriage of *S.aureus* (12-14,38,42). Some techniques have been tried to prevent catheter infection and peritonitis from *S.aureus*. These consist of vaccination for preventing staphylococcal infection (43), applying 2% sodium fusidate ointment at the pericatheter area. Some investigators have tried to get rid *S.aureus* in the nares by local applying 2% sodium fusidate (43), or 2% calcium mupirocin (44,45), or giving prophylactic oral antibiotics such as rifampicin (39), and ofloxacin (46). However, there is no study about the nasal carrier of *S.aureus* in Thailand. In this study, infection from *S.aureus* will be analyzed.

Age is one of the interesting issues , because it associates with high morbidity and mortality in many diseases. Aging, in this study, is defined as age equals or more than 60 years. From our pilot study in CAPD patients , people in this age group had a tendency to have high rate of peritonitis, high morbidity, and mortality from many causes. There are no studies in aging patients regarding the rate of peritonitis and the survival time in Thailand. Some hospitals in Thailand tend to limit performing CAPD in the aging patients . In Bhumibol Adulyadej Hospital, the patients are not limited by age to perform CAPD.

Chan-O and Sumethkul, from Ramathibodi Hospital, studied on the risk factors in Thai CAPD patients. They found that, the right to get government medicare system, failure to practice aseptic techniques, and the poor personal

and accommodation hygiene were associated with increased risk of peritonitis . They suggested that, limiting CAPD by age should be considered, because this group of patients tended to have the higher rate of peritonitis and shorter survival time (29). However, the majority of the population in their study was in middle age.

Many potential risk factors will be analyzed in this study, such as age, the presence of catheter infection, type of organisms, the presence of DM, some of laboratory investigation , type of CAPD bags and systems, and the duration of CAPD . Because aging, the presence of DM, and S.aureus infection may affect the long-term outcome of CAPD, so the survival analysis will be examined in these factors.