

CHAPTER 2

LITERATURE REVIEW

Beginning from the 1970's, hundreds of studies were carried out to investigate the efficacy of prophylactic antibiotics in neutropenic patients. Several prophylactic regimens were studied. The combination of a number of nonabsorbable drugs provided total gastrointestinal (GI) tract decontamination, which aimed at eliminating both the aerobic and anaerobic microbes of the GI tract. However, studies in animals and human showed that the total GI decontamination destroyed the colonization resistance of the intestinal mucosa against pathogenic microorganisms in the environment. As a result, GI tract was colonized by resistant bacteria and fungi. Therefore, preservation of the anaerobic flora of the alimentary tract while eliminating potentially pathogenic aerobic gram-negative bacilli was considered by most investigators to be especially important^[16]. This was also termed "selective decontamination".

TMP-SMZ and quinolone drugs are the most popular chemoprophylactic antibiotics^[5]. Studies showed that they could prevent documented infection of neutropenic patients compared to placebo controls^[17, 18]. But TMP-SMZ has been reported to prolong the period of granulocytopenia, increase fungal colonization or oral candidiasis^[9, 10]. In addition, its antibacterial spectrum doesn't include *P. aeruginosa*, a very common pathogen in leukemic patients. Fluoroquinolones have been found to be useful for preventing gram-negative bacteremia and have become

standard preventive-therapy strategy in many cancer centers. But recently fluoroquinolone-resistant bacteria have been isolated with increasing frequency^[19].

It was found by Cavallito (1944) that garlic has a strong antibacterial activity in vitro, Cavallito also demonstrated that allicin is the principle active component of garlic^[11]. Allicin is produced from alliin by the enzyme alliinase when the tissue of the garlic bulb is disrupted. It is likely that allicin functions by inactivating essential thiol groups of enzymes, possibly by formation of disulphide or by simple oxidation of adjacent thiols by the labile oxygen of the thiosulphide link^[20] and thus disrupt cell metabolism.

Most in vitro studies used aqueous garlic extract (AGE) and AGE has been shown active against many pathogenic microorganisms. However, there have been few studies in humans. Studies from China reported that oral AGE had successfully cured patients with fungal infection of the lungs^[21, 22]. Among 21 cases of cryptococcal meningitis, combination of oral, intramuscular and intravenous administrations of garlic extract had a total effective rate of 68.75%^[23]. Allicin solution has also been used in preventing newborn thrush^[24]. Lu DP et al^[25] reported using garlic extract to prevent cytomegalovirus infection after allogeneic bone marrow transplantation. None of the 13 patients having received intravenous garlic extract had cytomegalovirus infection. Garlic has also been reported effective in controlling the skin and oral fungal infection, diarrhea, fever and itching of AIDS patients^[26]. Most of these studies were performed without a strict control. Therefore, controlled clinical studies are necessary, based on the results of in vitro studies suggesting that

garlic is active against many pathogenic microorganisms. Until now, garlic has not been used as alimentary tract decontamination for infection prophylaxis.



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