Prediction and prevention of infectious complications in children with cancer

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Citation for published version (APA):
Scope of the thesis:

Improvement has been made over the past 30 years achieving better survival in pediatric oncology patients. This is now estimated around 70%.

With the intensification of chemotherapy, the need for adequate supportive care is of utmost importance to maintain this high percentage of survival. As therapy becomes more intense infectious complications still play a major role.

Prediction and prevention of infectious complications in children with cancer are the scope of this thesis. After a general introduction in chapter 1, chapter 2 will describe a retrospective cohort study in a pediatric oncology unit in South Africa focusing on causes of bacteremia and risk-factors for infection. Within the group of oncology patients it has become clear that some patients are more susceptible to infections than others, therefore chapter 3 presents a prospective cohort study on the role of mannan-binding lectin (MBL) answering the question if MBL deficiency in immuno-compromised children leads to a prolonged duration of neutropenia and to more severe infections. One of the most severe infectious complications in oncology patients is neutropenic enterocolitis. In Chapter 4a a case of neutropenic enterocolitis and typhlitis will be presented and in chapter 4b a prospective study will be presented including pediatric oncology patients with a clinical suspicion of neutropenic enterocolitis. The aim of the study is to gain insight into the pathogenetic mechanisms, and to identify clinical and inflammatory prognostic markers. It is known that this group of children is susceptible to infections therefore prevention of infections is even more important. One of the risk-factors for infection is the presence of a central venous catheter. Therefore in chapter 5 a Cochrane systematic review is presented on the use of prophylactic antibiotics to prevent Gram-positive bacteremia in tunnelled central venous catheters. On base of the available evidence a meta-analysis is done and a number needed to treat calculated to prevent these bacteremia's. In oncology patients the use of selective decontamination of the digestive tract (SDD) is still a matter of debate. Therefore in Chapter 6 a systematic review was performed to assess the evidence for the effectiveness of SDD to decrease bacteremia and infection-related mortality during neutropenic episodes in oncology patients.

Where chapter 5 and 6 focus on prevention of bacterial infections, chapter 7 concentrates on prevention of varicella by immunizing IgG negative children with the live-attenuated varicella vaccine in an early stage of their disease. If protection can be achieved then fear for varicella infection and the possible complications will be clearly reduced. Insight in the different aspects of infectious complications in children with cancer will improve management and open directions for future trials, mentioned in Chapter 8.