Why should paediatric patients with serious infections be hospitalized?

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Infection is the commonest cause of hospitalization in children and with regard to serious infection occurs largely because parenteral treatment is deemed necessary. However, there is growing awareness of the need to avoid hospitalization due to financial considerations, the risks of nosocomial infection, inconvenience, the psychological effects of disrupting family interactions, as well as the perceived unpleasant environment to the child. This awareness has led a number of centres to develop protocols for the outpatient treatment of serious infections in children (Goldenberg et al., 1984; Dagan et al., 1987; Powell & Mawhorter, 1987; Bradley, Ching & Phillips, 1988; Arditi & Yogev, 1990; Shudela, 1990; Dagan & Einhorn, 1991).

Since the first efforts of developing outpatient paediatric programmes, many have been developed which have adapted to local conditions and needs. It is therefore important to ask: How far can this trend go? Can all children with serious infections be treated as outpatients? In my opinion all types of infection can be treated, at least in part, on an ambulatory basis. However, the many components of such outpatient programmes need careful planning and integration. To assure success, the following questions must be answered.

With regard to the types of infection one must distinguish between those conditions which require supportive management, in addition to antibiotic treatment, from those for whom the antibiotic treatment alone is appropriate. Examples of the former are epiglottitis, meningitis and brain abscess, while conditions such as osteomyelitis, pneumonia with effusion or spreading cellulitis may require surgical intervention to aid recovery. In cases where there is no concern with regard to the stability of the patient only short term observation is warranted which can be achieved by limited hospitalization or by emergency room observation. Once the child's condition is stable and supportive treatment is no longer needed, the patient can be managed as an outpatient. Infections of the latter variety, such as cellulitis (including periorbital cellulitis) pneumonia, mastoiditis and complicated urinary tract infections can usually be treated on an outpatient basis without temporary admission to hospital.

The key to the successful outpatient management are the parents who should be deemed reliable, informed of the nature of the illness and its potential complications and the method for communicating with the medical team. The parents must be trained to deal with all aspects of intravenous treatment when this is needed and be supported by transport arrangements if necessary, to minimise disruption of the daily family routine.

The supporting medical facilities should also be appropriate. Some conditions can be managed as an outpatient in most medical facilities. However, when more comprehensive treatment is necessary facilities must have the ability to observe the child during the initial hours of treatment when the patient's condition has yet to stabilize. Supporting diagnostic facilities such as CT-scanning and surgical support may be necessary and require a multidisciplinary facility which widens the spectrum of infections that may be treated on an outpatient basis.

The characteristics of the antibiotic for parenteral outpatient treatment are also important. The preferred route for parenteral administration is intramuscular (im), provided that the drug is well tolerated, lacks toxicity, has a prolonged half-life and a spectrum of activity covering the likely pathogens, unless culture results are known when a narrow spectrum agent is preferred. The drug should be able to penetrate a variety of tissues adequately. Ceftriaxone meets most of these criteria. (Goldenberg et al., 1984; Dagan et al., 1987; Mawhorter, 1987; Ching & Phillips, 1988; Arditi & Yogev, 1990; Shudela, 1990; Dagan & Einhorn, 1991). Other drugs that may be used are teicoplanin for Gram-positive infections (Dagan et al., 1993).
and ceftazidime for pseudomonal infections (Dagan et al., 1992). In countries where intramuscular administration of antibiotics is less widely used the intravenous route is likely to be more widely adopted. When intravenous treatment is decided upon, drugs with a shorter half-life may be administered at the appropriate frequency provided a trained person is available to administer the drug.

The duration of parenteral treatment is also critical. Many serious infections that demand initial parenteral treatment may be treated with oral antibiotics once the patient is stable or the reasons necessitating parenteral treatment such as vomiting or bacteraemic infection have been controlled. The place of parenteral-oral switch for serious infections was described some years ago for osteomyelitis and septic arthritis (Nelson, Howard & Shelton, 1978; Prober & Yaeger, 1979; Prober, 1982). More recently other studies have emphasised this approach for other conditions (Dagan et al., 1994; Shalit et al., 1994). There is a need to better define the duration of parenteral versus oral treatment with the aim of shortening the parenteral treatment as much as possible.

A most important question concerns the potential risks associated with outpatient treatment of children with serious infections. The risks of hospitalization are well known. In contrast the complications and risks of outpatient treatment of serious infections are still not yet fully understood or indeed well studied (Graham, 1993) and should be addressed.

In conclusion, outpatient treatment for serious infections in children is feasible and can be recommended provided careful planning and satisfactory management is performed. The cost-benefit issues are beyond this brief review but there is much evidence that outpatient treatment is less expensive than hospital treatment.

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References


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Dosage and Administration: Preparation: See data sheet. Administration. Either i.v. (bolus or 30min infusion) or i.m. Adults or elderly patients with normal renal function: — Prophylaxis: 400mg intravenously at the induction of anaesthesia. — Severe infections: 400mg i.v. every 12 hours for first 3 doses followed by 400mg i.v. or i.m. once daily — Moderate infections: 400mg i.v. on day 1 followed by 200mg i.v. or i.m. once daily. Children: 10mg/kg i.v. every 12 hours for first 3 doses followed by 10mg/kg i.v. or i.m. daily in severe infections and neutropenic patients or 6mg/kg i.v. or i.m. daily in moderate infections. Can be used from 2 months of age. Neonates: A single loading dose of 15mg/kg on the first day of treatment, followed on subsequent days by maintenance doses of 8mg/kg once daily. These doses should be given as intravenous infusions over 30 minutes. See data sheet for dose in unusual situations, elderly, renally impaired and patients on CAPD.

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Legal Category: POM


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