Infectious Disease Emergencies

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Infectious disease emergencies (IDEs) are not uncommon. However, even in a classical infectious diseases textbook, only intracranial infection, bacteraemia, and fulminant pneumonia are included in the relevant chapter. In practice the spectrum of IDEs manifesting in an inpatient setting is much wider[1,2]. We define or will define as any clinically and microbiologically documented infection that by itself or as a complication of its treatment is liable to result in (i) irreversible local tissue or organ damage, permanent functional loss, or (ii) imminent death without urgent medical or surgical intervention or progressive system inflammatory response syndrome, to the extent that advanced life support or intensive care would soon be required.

Strategies in the Diagnosis of IDE

Constant vigilance, a systematic approach to any clinical problem, and timely consultation will enable early detection of conditions requiring urgent treatment, so that optimal management may be implemented early to prevent irreversible complications or death. All infections may initially be minor and appear innocuous, such as cellulitis developing from an inapparent skin wound. However, if the initial infective process is uncontrolled by the host defence mechanisms or appropriate therapy, it may result in potentially life-threatening diseases, such as group A streptococcal necrotising fasciitis or Streptococcus suis meningitis. It is essential that the diagnosis be made when the area of necrosis or extent of meningeal involvement is still limited. At this early stage, even though the pathology has been established and bacteria could be isolated from tissues or CSF, the clinical signs may not be typical. Nevertheless, the benefit of correct treatment at this stage is the greatest. Similarly, antibiotic-induced morbilliform rash is not an IDE, but erythema multiforme involving the mucosa heralds one. It may be too late if an IDE is declared only when frank skin exfoliation or gastrointestinal bleeding occurs. The clinical examples of IDEs encountered in our clinical consultation service are listed in Table 1.

Causes for Failure to Make an Early Diagnosis

Failure to recognise an emergency was related to several factors, the commonest being a presentation that does not conform to classic descriptions of the disease, such as deafness rather than neck rigidity in acute pyogenic meningitis. Furthermore, typical features may present in an atypical clinical setting. For example, CMV retinitis is a well-known complication in HIV-infected patients, requiring urgent anti-viral treatment, but suspicion of this entity may not be raised in non-AIDS cases. This illustrates the need to account for each acute clinical manifestation despite apparent incongruence.

Sometimes, diseases usually not directly related to the clinical specialty of the referring clinicians may also be missed. In this era of specialisation, clinicians often rely on their colleagues to deal with problems that do not fall strictly within their specialty. Thus, a considerable number of adverse reactions to antimicrobial agents were not recognised early.

Clinicians may also face difficulties with uncommon organisms and their associated pathology such as *Bartonella henselae*, rickettsiae, *Leptospira*, *Haemophilus aphrophilus*, and *Vibrio vulnificus*. Similarly, rare complications of common infections may not be appreciated such as *Clostridium difficile*-related toxic megacolon. A better liaison between the infectious disease specialist and the clinician can enable mutual exchange of knowledge and experience and ultimately result in improved care of patients in the early stages of an IDE.

Table 1. Examples of infectious disease emergencies encountered in the clinical consultation service at the Department of Microbiology, Queen Mary Hospital.

Organ system	Examples
Central nervous system and eye	• Acute meningitis • Cerebral and epidural abscess • Cytomegalovirus retinitis • Subdural empyema, endophthalmitis, cavernous sinus thrombosis, VZV anterior uveitis and keratitis, rhinocerebral mucormycosis
Cardiovascular system	• Infective endocarditis • Infected aortic aneurysm or graft • Pyopericardium, cardiac tamponade
Upper respiratory tract	• Imminent upper airway obstruction, e.g. mucositis, abscess • Fungal sinusitis, rhinocerebral mycosis
Lower respiratory tract and thorax	• Fulminant pneumonia • Miliary tuberculosis • Cavitary pneumonia with pneumothorax • Massive haemoptysis (aspergillosis in old tuberculous cavity) • Procedure-related mediastinitis
Alimentary system and peritoneum	• Tertiary peritonitis • Toxic megacolon (amoebic, typhoid) • Neutropenic ileocaecitis • Emphysematous cholecystitis
Skin and soft tissue	• Necrotising fasciitis and Fournier's gangrene • Gas gangrene • Orbital cellulitis
Bone and joint	• Pyogenic arthritis
Systemic	• Sepsis in immunocompromised patients including post-splenectomy sepsis and neutropenic sepsis • Severe sepsis and others*
Antibiotic-induced	• Hepatitis, renal failure • Xanthopsia, hearing loss • Allergic reactions • Convulsion

* Including gas gangrene, tetanus, severe falciparum malaria, hantavirus haemorrhagic fever with renal syndrome, chickenpox in an oncology patient, dengue haemorrhagic fever, bleeding due to severe thrombocytopenia as a result of rubella and infectious mononucleosis, toxic shock syndrome, perinephric abscess, emphysematous pyelonephritis, pyonephrosis.

Management of IDE

Regarding the care of patients with IDEs, the commonest contribution of the infectious disease specialist is to advise on the choice of appropriate antimicrobials. The proficiency of infectious disease specialists in antimicrobial chemotherapeutics also enables them to initiate modification of the dosage or route of administration as appropriate. Another contribution of the infectious disease team is the delineation, after thorough evaluation of patients and further investigations, of problems that were not apparent to the referring clinician. For example, necrotising fasciitis due to *V. vulnificus* is known to be rapidly progressive, and an early diagnosis can make a significant difference in the eventual outcome. Our experience is that needle aspiration is pivotal in establishing an aetiological diagnosis and indicating the choice of antimicrobials. Early extensive debridement, as guided by the Gram smear of the resection margin, is crucial for a favourable outcome. In the long run, the infectious disease team will help to raise the awareness of this IDE, alerting clinicians to future occurrences of similar conditions, and recognising the early outbreak of deadly disease like SARS[3].

Clues to Early Recognition of IDE

Patients with a systemic inflammatory response should be carefully evaluated for any underlying focus of infection that may not be apparent initially. Occupational history, local signs, or subtle radiological findings can also be useful pointers to the diagnosis and its emergency nature. Any condition involving vital organs such as the central nervous system (brain, spinal cord, and eye), the cardiovascular system (especially heart valves), and the upper airway should alert clinicians to the potential for irreversible damage due to an infection. Emergencies can arise as a result of serious toxicity from treatment; they are usually due to drugs, including hypersensitivity reactions, potentially irreversible organ toxicity, or other side effects.

References

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