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Review

Splenic rupture in infectious mononucleosis: A systematic review of published case reports

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ABSTRACT

Introduction: Infectious mononucleosis (IM) is a common viral illness that predominantly causes sore throat, fever and cervical lymphadenopathy in adolescents and young adults. Although usually a benign, self-limiting disease, it is associated with a small risk of splenic rupture, which can be life-threatening. It is common practice therefore to advise avoiding vigorous physical activity for at least 4–6 weeks, however this is not based on controlled trials or national guidelines. We reviewed published case reports of splenic rupture occurring in the context of IM in an attempt to ascertain common factors that may predict who is at risk.

Method: A search of MEDLINE and EMBASE databases was performed for case reports or series published between 1984 and 2014. In total, 52 articles or abstracts reported 85 cases. Data was extracted and compiled into a Microsoft Excel® spreadsheet.

Results: The average patient age was 22 years, the majority (70%) being male. The average time between onset of IM symptoms and splenic rupture was 14 days, with a range up to 8 weeks. There was a preceding history of trauma reported in only 14%. Abdominal pain was the commonest presenting complaint of splenic rupture, being present in 88%. 32% were successfully managed non-operatively, whereas 67% underwent splenectomy. Overall mortality was 9%.

Conclusions and recommendations: From our data, it appears that men under 30 within 4 weeks of symptom onset are at highest risk of splenic rupture, therefore particular vigilance in this group is required. As cases have occurred up to 8 weeks after the onset of illness, we would recommend avoidance of sports, heavy lifting and vigorous activity for 8 weeks. Should the patient wish to return to high risk activities prior to this, an USS should be performed to ensure resolution of splenomegaly. The majority of cases reviewed had no preceding trauma, although previous studies have suggested this may be so minor as to go unnoticed by the patient. It is therefore prudent to warn patients about the symptoms of splenic rupture to ensure prompt presentation and minimise treatment delay rather than focusing purely on activity limitation.

Contents

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Introduction

Patients diagnosed with infectious mononucleosis (IM) are generally fit and healthy adolescents and young adults. In the authors' experience, it is common practice to advise avoiding vigorous activity and contact sports for 4–6 weeks after the onset of symptoms due to the risk of splenic rupture. This rest period could have major implications for work and lifestyle. However, this is not based on controlled trials or national guidelines and therefore may vary with clinical judgement and local experience.

The aim of this study was to systematically review the published case reports pertaining to splenic rupture occurring in the context of IM in order to determine:

1. Which patients are at risk of splenic rupture;
2. When is splenic rupture most likely to occur in the chronology of IM;
3. Can it be prevented or predicted?

Infectious mononucleosis

IM is a benign lymphoproliferative disorder caused by the Epstein–Barr virus (EBV). EBV is a type of herpes virus with an incubation period of 30–50 days [1]. Transmission is via saliva, hence its colloquial name – 'the kissing disease', although contact history is not commonly reported [2]. It induces the proliferation of B-lymphocytes which triggers a clonal expansion of T-lymphocytes leading to lymphoid hyperplasia, lymphocytosis and cytokine release [3]. The typical presentation is with a four to five day prodrome of malaise and fever, followed by sore throat and tender cervical lymphadenopathy [4]. As well as enlarged cervical lymph nodes, there may be hepatosplenomegaly. Classically, the white cell count differential shows a lymphocytosis and an increased proportion of atypical lymphocytes [5]. The heterophile antibody test (e.g. monospot test) is very specific, but its sensitivity has been quoted at only 59–81% in patients over age 13, being lower in children under age 13 [6], and especially early in the course of the illness [5].

The EBV is ubiquitous in society [3,7], and by age 30, 90% of the population has been exposed [1]. Infection in early life tends to be asymptomatic, whereas infection in adolescents and adults commonly leads to IM [3,7]. Epidemiologic studies done in the United States of America in the 1960s identified an annual rate of 45.2/100,000 in a general population [4], however the rate was significantly higher amongst college students at 1112/100,000 [2]. The majority of cases occur between age 12 and 22 years, and males and females are affected equally, although females tend to acquire the condition at an earlier age [4].

The management of IM is supportive, with rest, analgesia and adequate hydration. However, accurate diagnosis of the condition and differentiation from bacterial tonsillitis is considered important due to the requirement to advise patients about the risk of splenic rupture.

Although usually a benign self-limiting viral illness, IM can cause life-threatening complications [7]. Examples include airway obstruction due to oedema, neurologic complications such as meningoencephalitis and Guillan–Barre syndrome, and splenic rupture [7]. Although morbidity and mortality caused by IM is rare, it is important as the disease predominantly affects young, healthy individuals.

The spleen in IM

In IM, the spleen is usually increased to 3–4 times normal size [8]. Although not necessarily palpable, when evaluated by ultrasound, splenomegaly has been detected in 100% of confirmed IM cases [9,10]. The first case of spontaneous splenic rupture as a complication of IM was reported in 1941 [11]. The incidence is now generally quoted at 0.1% [7,12]. Although there are many reports of spontaneous splenic rupture, some authors have suggested that in actual fact most cases will have some sort of preceding trauma, although it is too minor to recall [8]. A histological study of ruptured spleens in IM demonstrated that lymphocytic infiltration causes stretching of the splenic capsule, weakening of the trabeculae and increased bulk of the splenic pulp [8]. Not only is there weakening of the splenic architecture and increased fragility, but splenomegaly also causes reduced protection by the rib cage, and the combination of these factors predispose to rupture [8,13,14]. Some authors have suggested that it takes time for splenic architecture to be altered, and therefore rupture is most likely to occur in week three of the illness [8]. Unfortunately, no correlation has been found between the severity of IM and risk of splenic rupture [12].

Safe return to play in athletes

As IM commonly occurs in young healthy adults [2], the potentially life-threatening complication of splenic rupture poses a particular challenge in athletes. Clearly when the spleen is vulnerable to rupture, strenuous physical activity or contact sports should be avoided. However a prolonged period of inactivity could have major consequences for athletes and military personnel. There have been several articles that review this, attempting to determine safety of return to play in athletes [1,3,7,14–17]. Although there is much inconsistency amongst the literature, the general consensus from these review articles is that:

1. Patients should be asymptomatic [3];
2. Light activities (e.g. jogging/swimming) may be resumed after 21 days [3,7];