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Review Article

Spontaneous Splenic Rupture as the First Manifestation of Infectious Mononucleosis: A Review of Published Cases

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Abstract

Background: Splenic rupture is a rare but potentially fatal complication of infectious mononucleosis (IM), caused by Epstein-Barr virus, and can occur without trauma or, occasionally, before any other IM symptom is recognised.

Objective: To review published case reports, case series and pooled analyses of spontaneous splenic rupture as the presenting feature of IM.

Methods: Narrative review of case reports, systematic reviews, retrospective cohorts and sports-medicine position statements.

Findings: Pooled series describe 85-186 cases, 86-91% atraumatic, rupturing a median of 8-11.5 days (mean 14-15.4 days) after symptom onset, occasionally extending to 8 weeks. The only denominator-based incidence estimate is 0.062-0.111% among 8,116 IM patients. Splenectomy has historically predominated (66-84%), but a consecutive cohort achieved 90% non-operative success with zero mortality, against 4.8-9% mortality in pooled case reports, likely reflecting publication bias toward severe presentations.

Conclusions: Non-operative management is increasingly favoured when haemodynamically feasible; return-to-sport guidance remains low-grade evidence and should prioritise symptom education over fixed ultrasound thresholds.

Keywords: Infectious mononucleosis; Splenic rupture; Epstein-Barr virus; Splenectomy; Return to play

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Introduction

Infectious mononucleosis, caused by primary Epstein-Barr virus (EBV) infection, is common and usually self-limited, but splenic rupture is its most feared complication [1,2]. Two systematic reviews spanning decades of published cases — 85 cases from 52 articles (1984-2014) [3] and 186 cases from 171 articles (1970-2022) [4] — establish the modern evidence base, alongside a rare consecutive clinical cohort of 42 cases from the US Military Health System [5]. Rupture is usually preceded by several days of typical IM illness, but case reports document rupture occurring with minimal or no

antecedent symptoms, discovered only when abdominal catastrophe prompts investigation [6,7,8]. This review synthesises the pooled epidemiological and management literature with recently published individual cases to summarise presentation, diagnosis, management trends and return-to-activity guidance. Because splenic rupture is uncommon and the literature is dominated by individual case reports and pooled retrospective series rather than controlled trials, this synthesis emphasises where possible the largest available cohorts and flags where cited figures rest on a single case report repeated without independent verification.

Epidemiology

The figure most often quoted for incidence — 0.1% to 0.5% of IM patients — recurs across several case reports [2,7,6,9,10] without a traceable primary denominator. The only denominator-based estimate identified is from a single-institution 40-year retrospective series: 5 substantiated (and 4 additional suspected) atraumatic ruptures among 8,116 IM patients, giving 0.062% (0.111% including suspected cases) [11] — at or below the low end of the commonly cited range. Pooled case-report series describe a mean patient age of 22 years with 70% male predominance [3], or a median age of 20 years (IQR 17-25) with 60% male predominance [4], consistent with the age group most affected by primary EBV infection [12,13]. Trauma precedes rupture in only a minority: 14% in one series (86% atraumatic) [3] and 9.1% in another (90.9% atraumatic) [4]. For context, in a broader systematic review of 613 atraumatic splenic ruptures of any cause, over half presented as the first sign of an undiagnosed underlying disease, and infectious causes accounted for 23.3% of cases, though that series does not break infectious aetiologies down by organism [14]. Taken together, these figures suggest true incidence is probably closer to the lower end of the commonly quoted range, and that the widely repeated 0.1-0.5% figure should be treated as a rounded approximation rather than an

established epidemiological estimate until a modern population-level cohort is published.

Pathophysiology

EBV infects roughly 90% of adults worldwide, typically via oropharyngeal transmission, with an incubation period of about six weeks [13]. In a prospectively followed cohort of university students, 89% of primary infections were symptomatic, and illness severity correlated with blood EBV load and with the magnitude of the CD8+ T-lymphocyte response [15] — the atypical lymphocytosis of IM being predominantly an expansion of cytotoxic and reactive T cells responding to EBV-infected B cells [12]. This lymphoproliferative response distends the splenic parenchyma: serial ultrasound in patients with IM demonstrated enlargement in essentially all patients (mean 50-60% above baseline), disproportionate to what is detectable on palpation [16]. In collegiate athletes followed prospectively from acute illness, splenic length increased a mean of 33.6% above the individual's own baseline, peaking at a mean of 12.3 days from symptom onset before regressing roughly 1% per day, with resolution typically within 4-6 weeks [17]. The mechanical result is a spleen with a thinned, distended capsule and increased fragility, vulnerable to rupture from trivial or absent trauma, though no verified histological study of capsular thinning was located for this review.

Clinical Presentation

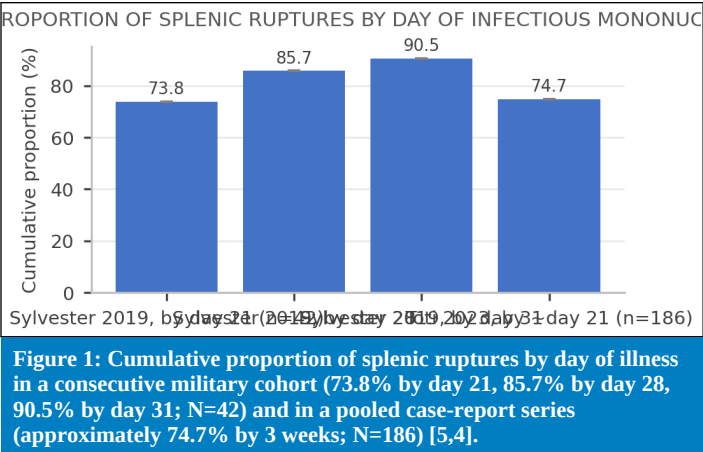
Rupture typically occurs early in the illness course. Pooled data give a mean interval from symptom onset to rupture of 14 days (range to 8 weeks) [3] or a median of 8 days (IQR 6-14), with approximately 80% occurring within 3 weeks and roughly 10% at 4 weeks or later [4]. The most granular timing dataset, from a consecutive cohort rather than a pool of case reports, gives a mean of 15.4 days (SD 13.5), a median of 11.5 days, and a range of 1-68 days, with 73.8% of ruptures occurring by day 21, 85.7% by day 28, and 90.5% by day 31 [5]. Abdominal pain is the presenting symptom in 88% of pooled cases [3], typically

left-upper-quadrant pain with referred left shoulder pain (Kehr sign), though presentations mimicking other acute abdominal pathology occur, including one case initially suspected to be acute cholecystitis [9]. Critically, rupture can be the sole presenting feature of otherwise unrecognised IM: one report describes splenic rupture with no other signs or symptoms of IM, diagnosed only by a positive heterophile antibody test after splenectomy [6], corroborated by a 26-year-old man presenting with syncope and haemorrhagic shock whose EBV serology was sent only after lymphocytosis was noted [8], and by a case in which rupture was detected on CT as the initial manifestation of the disease [7]. Recently published individual cases illustrate the range of severity: active contrast extravasation requiring emergency splenectomy in a 23-year-old man [18]; a grade V injury with massive haemoperitoneum in a young man requiring transfusion and ICU support [19]; and a three-case series in older adults (aged 67-79) in whom rupture was initially managed conservatively before deterioration prompted splenectomy in at least one case [20]. Notably, rupture has also been reported with a spleen of normal size on imaging, undermining reliance on splenomegaly as a warning sign [21].

Table 1: Published cases and case series of spontaneous splenic rupture as a manifestation of infectious mononucleosis reviewed here [2,6,7,21,9,19,10,25,26,18,8,20]; individual case reports supplement the pooled series analysed in the text.

Report	Age/s ex	Day of illness	Presentation	Management	Outco me
Asgari 1997	36/M	not stated	Spontaneous abdominal pain	Splenectomy	Surviv ed
Stockenge r 2003	not stated	No other IM sympt oms	Acute abdomen, het erophile-posit ive	Splenectomy	Surviv ed
Gayer 2003	not stated	not stated	Rupture as initial manifestation	not stated	not stated
Longi 2025	not stated	not stated	Rupture, normal-sized spleen	not stated	not stated

Report	Age/s ex	Day of illness	Presentation	Management	Outco me
Gavriliadis 2024	30/ no t stated	not stated	Mimicked cholecystitis	Emergency splenectomy	Surviv ed
Owies 2025	Late t eens/ M	~7 days	Prodromal flu-like illness	Emergency splenectomy	Surviv ed
Wilson 2025	16/F	not stated	Grade 3-4 injury	Embolisation, then splenectomy	Surviv ed
Munzi 2025	22/F	not stated	Atraumatic, Hb 7.8 g/dL	Embolisation, then splenectomy	Surviv ed
McQueen 2025	18/F	not stated	Atraumatic abdominal pain	Conservative management	Surviv ed
Sweeney 2026	23/M	not stated	Active contrast extravasation	Emergency splenectomy	Surviv ed
Coppola 2026	26/M	No preceding symptom s	Syncope, haemorrhagic shock	Emergency splenectomy	Surviv ed
Sogiwall a 2026, n=3	79/M; 67/F; 73/F	not stated	Atraumatic	Splenectomy (all 3)	Surviv ed (all 3)



Diagnostic Approach

Contrast-enhanced CT is the diagnostic standard for suspected splenic rupture, demonstrating haemoperitoneum, splenic laceration or active contrast extravasation [7,18]. Ultrasound is central to non-emergency assessment of splenomegaly but has substantial limitations. Splenic enlargement on ultrasound is nearly universal in IM but only "a few" cases

are detectable by palpation [16], meaning physical examination cannot reliably exclude splenomegaly or guide activity clearance. Compounding this, baseline splenic dimensions vary widely in healthy people: among 631 healthy Division I collegiate athletes, more than 7% already met published ultrasound criteria for splenomegaly before any infection, with men larger than women [22], and tall healthy athletes have a mean splenic length (12.19 cm) well above general population norms (8.94 cm, P<0.01) [23]. A fixed size threshold therefore risks both false-positive restriction and false-reassurance clearance; comparison against a documented personal baseline, obtained in only a minority of patients, is the only approach that avoids both errors [17]. Serial ultrasound has nonetheless been used clinically to support return-to-contact-sport decisions: in one series, 16 of 19 patients (84%) had normal splenic dimensions one month after diagnosis and were cleared, with the remainder normal by two months [24], though no study is powered to demonstrate that ultrasound clearance actually prevents rupture, given a baseline event rate near 0.1%.

Table 2: Detection of splenomegaly by ultrasound versus clinical examination, and baseline variability in healthy people [16,17,22,23,24].			
Study	Population	N	Finding
Dommerby 1986	IM patients, serial ultrasound to 120 days	29	All had enlarged spleen on ultrasound (mean +50-60%); only a few palpable
Hosey 2008	Collegiate athletes, acute IM, serial ultrasound	20	Splenic length +33.6% above baseline; peak at mean day 12.3; resolved in 4-6 weeks
Hosey 2006	Healthy Division I athletes, baseline ultrasound	631	>7% already met splenomegaly criteria while healthy; men larger than women
McCorkle 2010	Healthy tall athletes	66	Mean length 12.19 cm vs population mean 8.94 cm (P<0.01)
O'Connor 2011	Patients cleared for contact sport by serial ultrasound	19	84% normal dimensions at 1 month; remainder normal at 2 months

Management

Historically splenectomy has predominated. Pooled case-report data show splenectomy in 67% and successful non-operative management in 32% [3], while a larger pooled series found splenectomy in 66.1% (mostly immediate, some after failed conservative management) and non-operative management in 33.9%, including expectant management, transcatheter embolisation, partial splenectomy, splenic repair and image-guided haematoma aspiration [4]. By contrast, the one consecutive clinical cohort in this literature — rather than a pool of published reports — achieved non-operative management in roughly 90% of cases, with only 9.5% requiring splenectomy or embolisation [5], suggesting the true non-operative success rate in unselected practice is substantially higher than pooled case reports suggest. Angioembolisation is only sparsely evidenced in this specific disease: both individually verified embolisation cases in the recent literature progressed to splenectomy despite embolisation [10,25], and no comparative study of embolisation versus splenectomy versus observation exists for EBV-associated rupture specifically. Recent case reports nonetheless demonstrate successful primary non-operative management with multidisciplinary (haematology) involvement and structured activity restriction [26]. Return-to-sport guidance is comparatively weak evidence: current sports-medicine position statements recommend individualised, symptom-guided return rather than a fixed interval [27], while a retrospective cohort assigned its 31-day return recommendation only an evidence grade of C, chosen because it captured roughly 90% of observed ruptures while explicitly accepting a residual risk [5]. Because the large majority of ruptures are atraumatic, activity restriction itself has no demonstrated protective effect; the more defensible priority is educating patients to recognise and promptly report symptoms of rupture [3].

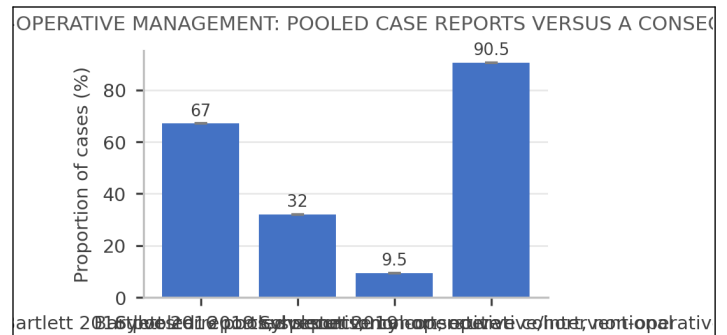


Figure 2: Splenectomy predominates in pooled published case reports (67% splenectomy, 32% non-operative; N=85) but non-operative management predominates in the one consecutive clinical cohort (90.5% non-operative, 9.5% operative/interventional; N=42) [3,5].

Outcomes and Prognosis

Mortality in pooled case-report series is 9% [3] or 4.8% (9/186) [4], considerably higher than the 0% mortality reported in the one consecutive clinical cohort [5]. This discrepancy is best explained by publication bias: a critical review of the world literature to 1978 found only 18 of 107 published "spontaneous rupture" cases met strict criteria for atraumatic rupture with confirmed IM, and all 18 survived [1], indicating that published series are enriched for severe, operated and occasionally fatal presentations rather than representing the full clinical spectrum. Among 42 consecutive confirmed cases, 25 of 35 with documented follow-up (71.4%) returned to pre-injury activity, nearly half within 90 days, though 28.6% did not return, predominantly because of chronic abdominal pain [5]. For comparison, all-cause atraumatic splenic rupture (not IM-specific) across 845 published cases carries considerably higher mortality (12.2%), with splenomegaly, age over 40 and neoplastic aetiology independently associated with death [28], suggesting IM-associated rupture in the predominantly young, otherwise healthy population described here carries a comparatively favourable prognosis once recognised and treated. An institutional series of 9 patients, 7 undergoing splenectomy and 2 managed with supportive care alone, reported all patients "alive and well" [11], reinforcing that outcomes are generally good when rupture is promptly

identified regardless of operative strategy chosen.

Conclusion

Spontaneous splenic rupture is a rare but life-threatening complication of infectious mononucleosis, occurring predominantly within the first three weeks of illness, usually without antecedent trauma, and occasionally before any other IM symptom is apparent. Clinicians evaluating unexplained left-upper-quadrant pain, syncope or haemorrhagic shock in a young adult should consider IM-associated rupture even in the absence of a preceding sore-throat-and-fatigue history. The published literature, dominated by case reports, likely overstates both mortality and splenectomy rates relative to unselected clinical practice, in which non-operative management now succeeds in the majority of cases. Return-to-sport recommendations remain low-grade evidence built on maximal observed intervals rather than controlled data, and clinicians should prioritise patient education about rupture symptoms over reliance on any single ultrasound threshold or fixed activity restriction.

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