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Review

Management of esophageal injuries secondary to trauma

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ABSTRACT

Traumatic esophageal injuries occur less than 10% of the time in the setting of blunt or penetrating trauma. The purpose of this literature review is to provide an update on the most recent changes involving the diagnosis and treatment of esophageal injuries. A literature search was conducted using PubMed, to identify articles written in English language with the terms “non- iatrogenic”, “esophageal”, “trauma”, “diagnosis”, “management”, and “prognosis”. Case reports and articles involving non-traumatic esophageal perforations were excluded. Fifty pertinent articles in English language from 1947 to 2015 were selected for review. Based on the review of all articles, we designed a diagnostic and therapeutic algorithm to facilitate the diagnosis and management of the traumatic esophageal injury.

Contents

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Introduction

Traumatic esophageal injury is a very rare entity that requires an individualized approach to its management [1]. The first report of an esophageal injury dates back to the surgical papyrus of Edwin Smith, approximately 2500 years BC. It described the injury as "*a gaping wound of throat, penetrating the gullet*" [2]. In 1941, Frink [3] reported the first case of penetrating esophageal injury treated successfully by surgical drainage. Subsequently, in 1947, Barrett [4] and Olsen and Clagett [5] published the first series of esophageal injuries treated with surgical repair.

Due to the low incidence and the constant presence of associated injuries that may mask the diagnosis, treatment of esophageal injuries is often delayed, therefore, contributing to the increased morbidity and mortality associated with esophageal injuries [6]. Although articles have been published on this topic as a multicenter study of the American Association for the Surgery of Trauma (AAST) [7], as an analysis of the National Trauma Data Bank [8], or even as guidelines of the Western Trauma Association (WTA) [9]. This article aims to provide a more comprehensive literature review for an extended period of time that encompasses almost seven decades. It includes the most recent advances involving the diagnosis and treatment of traumatic perforations of the esophagus.

Anatomy

The anatomic peculiarity of the esophagus is that it crosses three anatomical regions: the neck, chest, and abdomen. Unlike the rest of the digestive tract, the esophagus has a segmental blood supply without mesentery and serosal layer; therefore, its rupture is associated with rapid contamination of the neck, mediastinum, and/or abdomen depending on the location of the injury. As opposed to the aorta, carina, and/or main bronchi, which are at risk of injury following a horizontal deceleration mechanism of injury, the esophagus is rarely injured following a deceleration mechanism of injury [1]. Its size, the anatomical location protected within the chest wall, and the associated injuries that mask its diagnosis, account for the reported low incidence of traumatic esophageal injuries [10,11]. The difficulty of access, the poor network of collateral vessels, and the proximity to vital structures, all contribute to the high morbidity and mortality associated particularly to injuries of the thoracic esophagus [11,12]. The associated negative intrathoracic pressure favors rapid mediastinal and pleural contamination after esophageal rupture and, if not identified early and treated aggressively, causes a systemic inflammatory response, multi-organ failure, and frequently, death [11,12].

Incidence

Approximately 60% of esophageal injuries are iatrogenic, typically the result of either diagnostic or therapeutic endoscopic procedures [13–15]. The real incidence of esophageal injuries by external trauma is difficult to estimate given the paucity of available studies [14], although some authors report an incidence of less than 10% [13,16–18]. Due to the low frequency of these injuries, guidelines regarding its management are based mostly on retrospective studies with limited sample size. Among the reviewed series of traumatic esophageal injuries, the highest

Table 1
Incidence by sex and average age in esophageal trauma.

Author and year (n)	Duration of the study (years)	Men n (%)	Women n (%)	Average age (range)
Propovsky et al., 1974 [39] (11)	5	N/A	N/A	N/A
Symbas et al., 1980 [27] (48)	15	N/A	N/A	N/A (16–67)
Propovsky, 1984 [40] (15)	9	N/A	N/A	N/A
Weiman et al., 1995 [20] (19)	5	15 (79)	4 (21)	22 (17–55)
Flowers et al., 1996 [35] (31)	3	28 (903)	3 (9.7)	24 (16–54)
Asensio et al., 1997 [41] (43)	6	36 (84)	7 (16)	N/A
Srinavasan et al., 2000 [23] (55)	8	52 (94)	3(6)	29 (17–68)
Hanpeter et al., 2000 [22] (24)	14	21 (87.5)	3 (12.5)	26 (13–43)
Asensio et al., 2001 [7] (405)	10,5	355 (88)	50 (12)	29 (2–87)
Fadoo et al., 2003 [21] (11)	N/A	8 (72.7)	3 (27.3)	40 (16–84)
Vogel et al., 2005 [15] (47)	12	31 (66)	16 (34)	59 (18–90)
Bell et al., 2007 [42] (120)	5	89 (74.2)	31 (25.8)	34 (4–92)
Linden et al., 2007 [17] (43)	14	N/A	N/A	63 (32–94)
Eroglu et al., 2009 [18] (44)	20	28 (63.6)	16 (36.4)	53 (5–81)
Arantes et al., 2009 [43] (163)	7	153 (93.9)	10 (6.1)	27,5 (7–78)
Ahmed et al., 2009 [38] (33)	4	30 (91)	3 (9)	31 (22–40)
Onat et al., 2010 [14](12)	28	25 (83.3)	5 (16.7)	27,5 (2–71)
Patel et al., 2013 [8] (227)	2	N/A	N/A	28 (21–38)
Makhani et al., 2013 [12](327)	6	267 (81.7)	60 (18.3)	30 (9–50)
TOTAL (1696/1352)		1138 (84.2)	214 (15.8)	33 (2–94)

N/A: Non Available.

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