

**Dysphagia
EVIDENCE TABLE**

| Reference | Study Type | Patients/ Events | Study Objective (Purpose of Study) | Study Results | Strength of Evidence |
|--|------------|---------------------|---|--|-------------------------|
| 1. Wilcox CM, Alexander LN, Clark WS. Localization of an obstructing esophageal lesion. Is the patient accurate? <i>Dig Dis Sci</i> 1995; 40(10):2192-2196. | 13 | 139 | To determine if patient's sensation of dysphagia can accurately localize obstructing esophageal lesions. | Patients more accurate in localizing proximal rather than distal lesions, as distal lesions often cause referred dysphagia. | 1 |
| 2. Logemann JA. Role of the modified barium swallow in management of patients with dysphagia. <i>Otolaryngol Head Neck Surg</i> 1997; 116(3):335-338. | 12 | N/A | Reviews role and technique of modified barium swallow in patients with oropharyngeal dysphagia. | Modified barium swallow can be effective tool in rehabilitation of these patients. | 4 |
| 3. Pikus L, Levine MS, Yang YX, et al. Videofluoroscopic studies of swallowing dysfunction and the relative risk of pneumonia. <i>AJR</i> 2003; 180(6):1613-1616. | 13 | 381 | To determine relationship between swallowing dysfunction on barium studies and risk of aspiration pneumonia. | Likelihood of developing aspiration pneumonia directly related to degree of swallowing dysfunction on barium studies. | 1 |
| 4. Levine MS, Rubesin SE. Radiologic investigation of dysphagia. <i>AJR</i> 1990; 154(6):1157-1163. | 12 | N/A | Presents a practical approach for radiologic investigation of dysphagia. | The radiologic examination of the pharynx and esophagus should be tailored according to the nature and location of dysphagia. | 4 |
| 5. Rubesin SE. Oral and pharyngeal dysphagia. <i>Gastroenterol Clin North Am</i> 1995; 24(2):331-352. | 12 | N/A | Reviews a radiologic approach for evaluating patients with pharyngeal swallowing disorders. | Both structural and functional abnormalities of the pharynx can be well shown on barium studies. | 4 |
| 6. Schima W, Pokieser P, Schober E, et al. Globus sensation: value of static radiography combined with videofluoroscopy of the pharynx and oesophagus. <i>Clin Radiol</i> 1996; 51(3):177-185. | 9 | 130 | To determine diagnostic value of static images combined with video-fluoroscopy vs either technique alone in patients with globus sensation. | Videofluoroscopy combined with static images revealed significantly more abnormalities in pharynx and esophagus than either technique alone. | 2 |
| 7. Levine MS, Chu P, Furth EE, Rubesin SE, Laufer I, Herlinger H. Carcinoma of the esophagus and esophagogastric junction: sensitivity of radiographic diagnosis. <i>AJR</i> 1997; 168(6):1423-1426. | 13 | 50 | To determine sensitivity of double contrast esophagram in diagnosing cancer of esophagus and esophagogastric junction. | Double contrast esophagography had sensitivity of 96% in diagnosing these tumors. | 3 |
| 8. DiPalma JA, Prechter GC, Brady CE, 3rd. X-ray-negative dysphagia: is endoscopy necessary? <i>J Clin Gastroenterol</i> 1984; 6(5):409-411. | 13 | 195 | To determine if endoscopy increased chances of finding esophageal cancer in patients with radiographic-negative dysphagia. | No cases of esophageal cancer found by endoscopy that had been missed on barium study. | 2 |

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| 9. Halpert RD, Feczko PJ, Spickler EM, Ackerman LV. Radiological assessment of dysphagia with endoscopic correlation. <i>Radiology</i> 1985; 157(3):599-602. | 13 | 127 | To determine frequency of abnormalities on biphasic esophagrams in patients with dysphagia and correlate with endoscopy. | 77% of patients with dysphagia had abnormal barium studies; 3.3% had esophageal cancer; no cancers missed on barium study. | 2 |
| 10. Chen YM, Ott DJ, Gelfand DW, Munitz HA. Multiphasic examination of the esophagogastric region for strictures, rings, and hiatal hernia: evaluation of the individual techniques. <i>Gastrointest Radiol</i> 1985; 10(4):311-316. | 9 | 159 | To compare sensitivity of single contrast vs double contrast techniques for detection of lower esophageal rings. | Single contrast technique detected 100% of lower esophageal rings vs 34% by double contrast technique. | 2 |
| 11. Ott DJ, Chen YM, Wu WC, Gelfand DW, Munitz HA. Radiographic and endoscopic sensitivity in detecting lower esophageal mucosal ring. <i>AJR</i> 1986; 147(2):261-265. | 9 | 60 | To compare radiographic and endoscopic sensitivities in patients with lower esophageal rings. | 95% of lower esophageal rings detected by barium esophagography vs 76% by endoscopy. Radiographic examination more accurate | 3 |
| 12. Ott DJ, Chen YM, Wu WC, Gelfand DW. Endoscopic sensitivity in the detection of esophageal strictures. <i>J Clin Gastroenterol</i> 1985; 7(2):121-125. | 9 | 90 | To determine endoscopic sensitivity in detecting peptic esophageal strictures. | Barium studies detected 95% of all strictures. Endoscopy and radiology are equally effective and complementary methods | 2 |
| 13. Ott DJ, Gelfand DW, Lane TG, Wu WC. Radiologic detection and spectrum of appearances of peptic esophageal strictures. <i>J Clin Gastroenterol</i> 1982; 4(1):11-15. | 9 | 80 | To compare radiology and endoscopy in diagnosis of peptic strictures. | Radiology detected 95% of all strictures. | 3 |
| 14. Barloon TJ, Bergus GR, Lu CC. Diagnostic imaging in the evaluation of dysphagia. <i>Am Fam Physician</i> 1996; 53(2):535-546. | 12 | N/A | Reviews causes of oropharyngeal and esophageal dysphagia. | Advocates barium study for diagnosing these lesions. | 4 |
| 15. Kahrilas PJ. Clinical approach to dysphagia. In: Gore RM, Levine MS, Laufer I, eds. <i>Textbook of gastrointestinal radiology</i> . Philadelphia, Pa: Saunders. 1992:2464-2473. | 15 | N/A | Presents clinical approach to dysphagia. | Advocates barium swallow as screening test for dysphagia. | N/A |
| 16. Phillips AJ, Nolan DJ. Radiology of oesophageal dysphagia. <i>Br J Hosp Med</i> 1995; 53(9):458-466. | 12 | N/A | Reviews spectrum of abnormalities that cause dysphagia. | Advocates barium radiology as investigation of choice in patients with dysphagia. | 4 |
| 17. Richter JE. Approach to the patient with dysphagia. In: Kelley WN, ed. <i>Textbook of Internal Medicine</i> , 3rd ed. Philadelphia, Pa: Lippencott-Raven. 1997:590-593. | 15 | N/A | Presents overall clinical approach to patient with dysphagia. | Favors barium study as initial test for evaluation of these patients. | N/A |

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| 18. Ott DJ, Richter JE, Chen YM, Wu WC, Gelfand DW, Castell DO. Esophageal radiography and manometry: correlation in 172 patients with dysphagia. <i>AJR</i> 1987; 149(2):307-311. | 9 | 172 | To correlate radiographic and manometric findings in patients with dysphagia. | Barium studies had overall sensitivity of 89% and specificity of 91% in diagnosing esophageal motility disorders. | 2 |
| 19. Schima W, Stacher G, Pokieser P, et al. Esophageal motor disorders: videofluoroscopic and manometric evaluation--prospective study in 88 symptomatic patients. <i>Radiology</i> 1992; 185(2):487-491. | 9 | 88 | Prospective study to correlate videofluoroscopic and manometric findings in patients with dysphagia, chest pain, or scleroderma. | Videofluoroscopy had overall sensitivity of 80% and specificity of 79% in diagnosing esophageal motility disorders. | 3 |
| 20. Amaravadi R, Levine MS, Rubesin SE, Laufer I, Redfern RO, Katzka DA. Achalasia with complete relaxation of lower esophageal sphincter: radiographic-manometric correlation. <i>Radiology</i> 2005; 235(3):886-891. | 13 | 21 | Retrospective study to evaluate presence of complete LES relaxation on manometry in patients with achalasia on barium studies. | Nearly one-third of patients with achalasia on barium studies had complete LES relaxation on manometry and symptoms resolved in all after treatment for achalasia. | 3 |
| 21. Maurer AH. Scintigraphic evaluation of the upper gastrointestinal tract. In: Gore RM, Levine MS, Laufer I, eds. <i>Textbook of gastrointestinal radiology</i> . Philadelphia, Pa: Saunders. 1992:316-332. | 15 | N/A | Reviews role of radionuclide esophageal transit studies in patients with suspected esophageal dysmotility. | Radionuclide esophageal transit scintigraphy is a simple, noninvasive, and quantitative test of motility. | N/A |
| 22. Paramsothy M, Goh KL, Kannan P. Oesophageal motility disorders: rapid functional diagnosis using computerised radionuclide oesophageal transit study. <i>Singapore Med J</i> 1995; 36(3):309-313. | 10 | 10 | To evaluate radionuclide esophageal transit studies for diagnosing esophageal dysmotility in patients with chest pain or dysphagia. | All 10 patients had accurate diagnosis of esophageal dysmotility with this technique. | 4 |
| 23. Stacey B, Patel P. Oesophageal scintigraphy for the investigation of dysphagia: in ans out of favour - underused when available. <i>Eur J Nucl Med Mol Imaging</i> 2002; 29(9):1216-1220. | 12 | N/A | Reviews role of radionuclide esophageal studies in patients with dysphagia. | Esophageal scintigraphy is a simple, rapid, non-invasive test for assessing esophageal transit and function in a quantifiable way in patients with dysphagia. | 4 |

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| 24. Bonacini M, Young T, Laine L. The causes of esophageal symptoms in human immunodeficiency virus infection. A prospective study of 110 patients. <i>Arch Intern Med</i> 1991; 151(8):1567-1572. | 13 | 110 | Prospective study to determine: A. The prevalence of infectious agents in patients with HIV infection and odynophagia or dysphagia. B. The utility of endoscopic, histologic, cytologic, and virologic testing for the diagnosis of esophagitis. C. The yield of blind brushings of the esophagus in this setting. | <ul style="list-style-type: none"> • 72/110 patients had a total of 100 esophageal infections. 33 had Candida alone, 22 had Candida and cytomegalovirus (CMV). • 50/55 patients with plaques alone had Candida, and two (4%) had only viral infection. • The sensitivity of endoscopic brushings (95%) was better than that of histologic examination (70%) in the diagnosis of Candida esophagitis. Likewise, viral cultures of brushings or biopsy specimens were more sensitive (67%) than histologic examination (35%) for viral esophagitis. • Blind brushing of the esophagus had a sensitivity and specificity for infectious esophagitis of 84% and 75%, respectively. • Oral thrush had a sensitivity of 53% and a positive predictive value of 77% for Candida esophagitis. | 2 |
| 25. Connolly GM, Hawkins D, Harcourt-Webster JN, Parsons PA, Husain OA, Gazzard BG. Oesophageal symptoms, their causes, treatment, and prognosis in patients with the acquired immunodeficiency syndrome. <i>Gut</i> 1989; 30(8):1033-1039. | 13 | 154 AIDS patients | Descriptions of symptomology, disease status, and treatment for this patient group. | Among this patient group, 48 (31%) complained of pain on swallowing both liquids and solids and 32 (21%) of these also had dysphagia. | 2 |
| 26. Smith PD, Eisner MS, Manischewitz JF, Gill VJ, Masur H, Fox CF. Esophageal disease in AIDS is associated with pathologic processes rather than mucosal human immunodeficiency virus type 1. <i>J Infect Dis</i> 1993; 167(3):547-552. | 13 | 25 | Twenty-five patients with AIDS and esophageal symptoms were evaluated for the presence of esophageal disease and human immunodeficiency virus type 1 (HIV-1) in the esophageal mucosa. | Esophageal disease in patients with AIDS appears to be associated with specific pathologic processes rather than the presence of HIV-1 in esophageal mucosa. | 3 |
| 27. Wilcox CM, Schwartz DA, Clark WS. Esophageal ulceration in human immunodeficiency virus infection. Causes, response to therapy, and long-term outcome. <i>Ann Intern Med</i> 1995; 123(2):143-149. | 3a | 100 | Prospective cohort study to determine the causes of esophageal ulceration, the response rate to currently available therapies, and the long-term outcome in patients with human immunodeficiency virus (HIV) infection. | Broad spectrum of causes of esophageal infection, each of which requires specific therapy, and many of which respond well to therapy. In light of these findings, it is important to do endoscopic evaluation with mucosal biopsy in patients with HIV infection so that a diagnosis can be established and appropriate therapy instituted. | 2 |

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| 28. Rabeneck L, Laine L. Esophageal candidiasis in patients infected with the human immunodeficiency virus. A decision analysis to assess cost-effectiveness of alternative management strategies. <i>Arch Intern Med</i> 1994; 154(23):2705-2710. | 15 | N/A | A decision-analytic model was used to determine the clinical and economic effects of alternative management strategies for HIV patients w esophageal candidiasis. | From the perspective of the payer of medical care, empiric fluconazole is the most cost-effective strategy for the initial management of patients infected with the human immunodeficiency virus with esophageal symptoms. | 3 |
| 29. Wilcox CM, Alexander LN, Clark WS, Thompson SE, 3rd. Fluconazole compared with endoscopy for human immunodeficiency virus-infected patients with esophageal symptoms. <i>Gastroenterology</i> 1996; 110(6):1803-1809. | 1 | 134 | A randomized study to compare outcomes, safety and cost-effectiveness of fluconazole compared with endoscopy as a treatment strategy for HIV-infected patients with new-onset esophageal symptoms. | Empirical oral antifungal therapy with fluconazole is highly efficacious, safe, and cost-effective for HIV-infected patients with new-onset esophageal symptoms. | 2 |
| 30. Balthazar EJ, Megibow AJ, Hulnick D, Cho KC, Beranbaum E. Cytomegalovirus esophagitis in AIDS: radiographic features in 16 patients. <i>AJR</i> 1987; 149(5):919-923. | 13 | 16 | To assess radiographic findings in patients with CMV esophagitis. | CMV esophagitis characterized by solitary or multiple ulcers, often large or deep. | 3 |
| 31. Levine MS, Loevner LA, Saul SH, Rubesin SE, Herlinger H, Laufer I. Herpes esophagitis: sensitivity of double-contrast esophagography. <i>AJR</i> 1988; 151(1):57-62. | 10 | 25 | To determine radiographic accuracy of double contrast esophagography in diagnosing herpes esophagitis. | Abnormalities almost always detected on double contrast studies and in more than 50% of cases a specific diagnosis of herpes esophagitis could be made. | 3 |
| 32. Levine MS, Macones AJ, Jr., Laufer I. Candida esophagitis: accuracy of radiographic diagnosis. <i>Radiology</i> 1985; 154(3):581-587. | 9 | 34 | Retrospective study to determine sensitivity of double contrast esophagram in diagnosing Candida esophagitis. | Double contrast esophagography had sensitivity of 88%. | 3 |
| 33. Levine MS, Woldenberg R, Herlinger H, Laufer I. Opportunistic esophagitis in AIDS: radiographic diagnosis. <i>Radiology</i> 1987; 165(3):815-820. | 10 | 90 | Retrospective study to determine ability of double contrast esophagram to differentiate fungal and viral esophagitis in patients with AIDS. | Fungal and viral esophagitis usually differentiated on C/C studies without need for endoscopy. | 3 |
| 34. Sor S, Levine MS, Kowalski TE, Laufer I, Rubesin SE, Herlinger H. Giant ulcers of the esophagus in patients with human immunodeficiency virus: clinical, radiographic, and pathologic findings. <i>Radiology</i> 1995; 194(2):447-451. | 13 | 21 | Retrospective study to determine if HIV and CMV ulcers in HIV-positive patients can be differentiated on clinical or radiographic criteria. | It was not possible to differentiate giant HIV and CMV ulcers by these criteria, so endoscopy required for diagnosis. | 3 |
| 35. Vahey TN, Maglente DD, Chernish SM. State-of-the-art barium examination in opportunistic esophagitis. <i>Dig Dis Sci</i> 1986; 31(11):1192-1195. | 9 | 25 | Comparative study to determine sensitivity of double contrast esophagography in diagnosing Candida esophagitis. | Double contrast esophagography had sensitivity of 92%. | 3 |

Evidence Table Key

Study Type Key

Numbers 1-7 are for studies of therapies while numbers 8-15 are used to describe studies of diagnostics.

1. Randomized Controlled Trial — Treatment
2. Controlled Trial
3. Observation Study
 - a. Cohort
 - b. Cross-sectional
 - c. Case-control
4. Clinical Series
5. Case reviews
6. Anecdotes
7. Reviews

8. Randomized Controlled Trial — Diagnostic
9. Comparative Assessment
10. Clinical Assessment
11. Quantitative Review
12. Qualitative Review
13. Descriptive Study
14. Case Report
15. Other (Described in text)

Strength of Evidence Key

- Category 1 - The conclusions of the study are valid and strongly supported by study design, analysis and results.
- Category 2 - The conclusions of the study are likely valid, but study design does not permit certainty.
- Category 3 - The conclusions of the study may be valid but the evidence supporting the conclusions is inconclusive or equivocal.
- Category 4 - The conclusions of the study may not be valid because the evidence may not be reliable given the study design or analysis.