

# COMPARATIVE STUDY BETWEEN METHYLENE BLUE DYE, VIDEOFLUOROSCOPY AND BARIUM SWALLOW AS PREDICTORS OF SALIVARY FISTULA AFTER PHARYNGEAL RECONSTRUCTION

Ashraf Hamza Taha Rania Mohamed Abdou, Sherif Abdelmonem Shama, Sandra Nazmy Georgy Attaallah

Department of Otorhinolaryngology, Faculty of Medicine, Alexandria University

## Introduction

Pharyngeal reconstruction is essential in restoring swallowing, speech, and breathing functions in patients undergoing head and neck cancer surgery or trauma repair. Complications such as pharyngocutaneous fistula (PCF)—an abnormal connection between the pharynx and skin—remain a significant challenge. PCF increases patient morbidity, delays healing, and prolongs hospitalization. Risk factors for PCF include patient comorbidities, previous radiation, poor nutrition, and extensive surgery. Early and accurate diagnosis facilitates timely intervention, which improves patient outcomes and plays a crucial role in reducing the risk of complications. There is no single gold standard diagnostic tool. So, various diagnostic tools can be used such as methylene blue dye test, barium swallow, and videofluoroscopy. Each method has its strengths and limitations, making it necessary to compare their effectiveness. This study compares these diagnostic modalities to establish evidence-based recommendations for early PCF detection and better postoperative care.

## Aim of the work

The aim of this study is to compare between the results of methylene blue dye test, barium swallow test and videofluoroscopy in patients undergoing pharyngeal reconstruction surgery to asses the best method for early detection of salivary fistula in order to start oral feeding.

## Patients

**Inclusion criteria:**  
A total of 30 Patients who underwent resection of laryngeal or hypopharyngeal cancer requiring pharyngeal reconstruction in Otorhinolaryngology Department in Alexandria Main University Hospital was enrolled in this study.

**Exclusion criteria:**  
Patients refusing the study.

## Methods

This prospective study was conducted at Alexandria Main University Hospital after obtaining ethical approval and informed consent. Demographic and clinical data were collected for all patients. Three diagnostic tests were used to detect salivary fistula postoperatively. The methylene blue dye test was performed on day 5 post operative, where patients swallowed diluted dye, and leakage was monitored in neck drains. On day 6, a video-fluoroscopic swallow study was done using a water-soluble contrast to detect leakage. Finally, a barium swallow test was performed to identify any contrast leakage outside the pharyngeal or esophageal tract.

## Results

Table (1): Distribution of the studied cases according to Methylene Blue test, Videofluoroscopy and barium Swallow tests results (n = 30)

	No.	%
Methylene Blue test		
Negative	28	93.3
Positive	2	6.7
Videofluoroscopy		
Negative	29	96.7
Positive	1	3.3
Negative (Sealed leakage)	1	3.3
Negative (aspiration)	1	3.3
Negative (Minor leakage)	1	3.3
Barium Swallow		
Negative	29	96.7
Positive	1	3.3
Negative (Sealed leakage)	1	3.3
Negative (Minor leakage)	1	3.3
Patient with methylene blue test, Videofluoroscopy and barium swallow “positive”	1	3.3

Table (2): Comparison between Methylene Blue, Videofluoroscopy and Barium Swallow tests outcomes and significance (n = 30)									
	Methylene Blue		Videofluoro scopy		Barium Swallow		Test of sig.(p1)	Test of sig.(p2)	Test of sig.(p3)
	No.	%	No.	%	No	%			
Negative	28	93.3	29	96.7	29	96.7	McN= 14.483 (1.000)	McN= 14.483 (1.000)	McN= 30.000 (1.000)
Positive	2	6.7	1	3.3	1	3.3			
Negative	28	93.3	26	86.7	27	90.0	MH= 5.000 (0.088)	MH= 3.500 (0.166)	MH= 1.500 (0.317)
Negative (Sealed leakage)	0	0.0	1	3.3	1	3.3			
Negative (aspiration)	0	0.0	1	3.3	0	0.0			
Negative (Minor leakage)	0	0.0	1	3.3	1	3.3			
Positive	2	6.7	1	3.3	1	3.3			
Fr (p0)	4.667 (0.097)								

## Conclusion

No single test was clearly superior, but each had unique advantages. Videofluoroscopy provided dynamic evaluation to detect PCF and leaks, and detected issues like aspiration. The methylene blue dye test was a simple, low-cost bedside option useful in low-resource settings or for immobile patients. Barium swallow showed similar results to videofluoroscopy in identifying PCF and leaks.