World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

ENDOSCOPIC EXAMINATION OF UPPER GASTROINTESTINAL TRACT

Dr. Ahmed Mohammed Ahmed
Applied clinical anatomy, Iraq
Human.anatomy.ha@gmail.com
Abdullah Abdulkhaliq Qazzaz
High Diploma of Emergency Medicine, Iraq
Abdullahqazzaz742000@yahoo.com
Dr. Hydair Sachet Khalaf
M. Sc Pharmacology therapeutics, Iraq
haydairsachetk@yahoo.com

Article history:

Received: June 11th 2022
Accepted: July 14th 2022
Published: August 21st 2022

Abstract:

It is well-known that most of the descriptions of the gastrointestinal tract (specifically upper gastrointestinal tract concerned in our study), were obtained from anatomical observation of a cadaver and few clinical notes. Consequently, the clinicians depend on these points in their diagnosis and managements.

In this study a trial to throw a light on the anatomy of upper gastrointestinal tract through endoscopical examination of human being.

For this reason, fifty patients, twenty seven are males and 23 are females, were examined using a flexible gastroscope in the gastrointestinal tract Endoscopy Department in Baghdad Teaching Hospital, during the period from January 2004 till November 2004, all the patients are complaining from upper gastrointestinal tract problem were examined endoscopically.

During examination we concentrated on the interior surface of the esophagus, the length of the esophagus and its relation with the body height, the distance of the Z-line from the cardiac orifice, the sliding hiatus hernia, and the interior surface of the stomach, the first and the second parts of the duodenum. All these were examined as general anatomical structure with a clinical view.

The results obtained from this work discussed briefly with the conventional anatomical picture documented by most of the anatomical authors.

The outcome of this study could be summarized as follow:

1. There are no true constrictions in the wall of esophagus, but what seen is an indentation in the wall of the esophagus of the closely related structures to the esophagus except the cricopharyngeus and the gastroesophageal sphincter.
2. The average length of the esophagus in Iraqi people is 23.4 cm. from the cricopharyngeus to the cardiac orifce.
3. There is a moderate relation-ship between body height and esophagus length.
4. The mean distance of the Z-line from the cardiac orifice is 2.5 cm.
5. Some informations, regarding Barrett's esophagus and the preventing factors of reflux esophagitis, had been clarified.
6. In all cases of the duodenitis, the first part of the duodenum must be affected, while the second part was affected only in sever cases.

Keywords:

AIM OF THE STUDY

1- Study the anatomy of the upper gastrointestinal tract (esophagus, stomach, the first and the second parts of the duodenum) through endoscopic examination.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

2- Study the correlation of the anatomy of this part of the gastrointestinal tract with pathological changes in the affected area.

INTRODUCTION

1.1 EMBRYOLOGY OF THE FOREGUT (Postpharyngeal Foregut) GENERAL STRUCTURAL FEATURES:

The alimentary canal has its embryological origin in the yolk sac. It is lined by epithelium derived from the endoderm, and out growths from this epithelium (liver and pancreas) is thus endodermal in origin [1].

Although the postdiaphragmatic gut is subdivided into three embryological portions, fore- mid- and hindgut, there are no corresponding fundamental morphological and cytological distinctions between the three parts. Thus the foregut produces a portion of the duodenum as does the midgut, and the midgut similarly produces large intestine as does the hindgut. The differences between portions of the gut develop as a result of interactions between the three embryonic tissue layers which give rise to the gut, namely:

- The endodermal inner epithelium
- The thick layer of splanchnopleuric mesenchyme
- The outer layer of proliferating splanchnopleuric coelomic epithelium [2].

1.1.1 EMBRYOLOGY OF THE ESOPHAGUS:

When the embryo is approximately 4weeks old, the *respiratory diverticulum (lung bud*) appears at the ventral wall of the foregut at the border with the pharyngeal gut. The *esophagotracheal septum* gradually partitions this diverticulum.from the dorsal part of the foregut. In this manner the foregut is divided into a ventral portion, the *respiratory primordium*, and a dorsal portion, the *esophagus*. At first the esophagus is short, but by the descent of the heart and lungs, it lengthens rapidly .The muscular coat which is formed by the surrounding splanchnic mesenchyme, is striated in its upper two-thirds and innervated by the vagus, the muscle coat is smooth in the lower one-third and is innervated by splanchnic plexus [3].

1.1.2 EMBRYOLOGY OF THE STOMACH:

The stomach appears as a fusiform dilation of the foregut in the fourth week of development. During the following weeks, its appearance and position change greatly as a result of different rate of growth in various region of its wall, and the changes in position of the surrounding organs. The positional changes of the stomach are most easily explained by assuming that it rotates around a longitudinal and an antero-posterior axis. Around its longitudinal axis, the stomach rotates 90 degree clockwise, causing its left side to face anteriorly and its right side, posteriorly [4].

Hence, the left vagus nerve initially innervates the left side of the stomach, now innervates the anterior wall, similary the right vagus innervates the posterior wall.

During this rotation, the original posterior wall of the stomach grows faster than the anterior portion, forming the *greater and lesser curvature*s [3].

PATIENTS AND METHOD

2.1 Patients

The patients involved in this study were fifty patients complaining from clinical problems in the upper gastrointestinal tract (esophagus, stomach, first and second parts of the duodenum).

All the patients were adult with age group ranging from 18-78 years old. Twenty seven of them are male, and twenty three of them are female. The patients' body lengths range between 155- 189 cm. The patients' weight was between 58-96 kgms.

All the patients, involved in this study, were exposed to endoscopic examination of the upper gastrointestinal tract. During examination, we concentrated upon:-

A- The interior surface of the esophagus.
B- The esophageal constrictions.
C- The length of the esophagus and its relation with the body length.
D-The distance of the Z-line from the cardiac orifice, and its relation with the Barrett's esophagus.
E- The Z- line, the presence of B- line and the web ring and their relation with the Z-line and differentiate from the esophageal contractions.
F- The hiatus hernia if present.
G- The presence of the gastro-esophageal reflux in patients who had sliding hiatus hernia.
H- The interior surface of the stomach.
I- The mucosal lining of the 1st and 2nd parts of the duodenum, with its pathological relation with the gastro-esophageal reflux disease.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

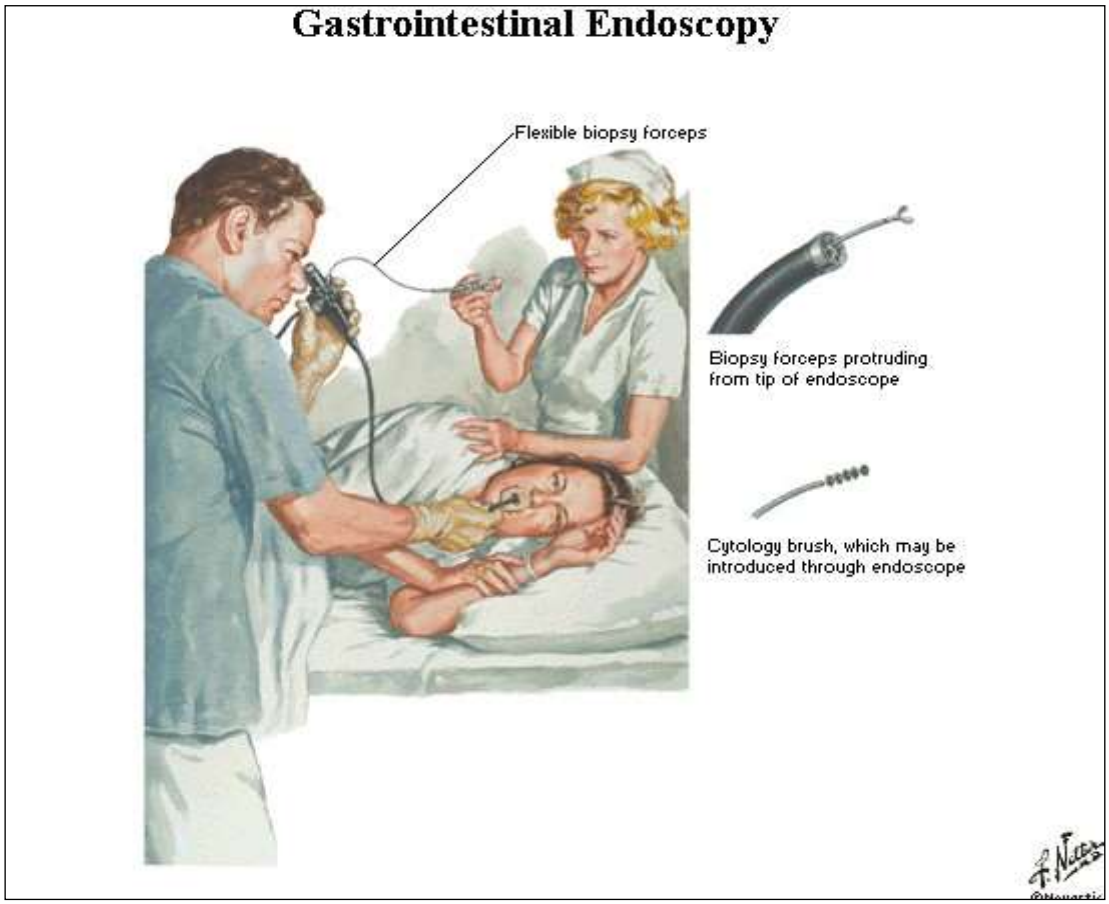


Figure (2.1): The endoscope parts and its technique. [5]

2.2 Method

At first we ask the patient to stand on the balance and ruler devise to measure the weight and the length of the patient.

Then the patient received a spray medication to anaesthetize the back of the throat and intravenous medications to relax the patient (Dizepam 10 m.g. and Hyoscine-N- Butylbromide 20 m.g. ampules slowly, intravenous). Then the patient was being lie on his left side with semiflexid neck.

Once the patient is relaxed the doctor slowly inserted the endoscope into the mouth and down into the stomach and intestines.

A 120-cm forward viewing fibro-optic endoscope is favored for routine diagnostic upper endoscopy. It is essential to have a trained assistant at the patient's head throughout the examination. This individual can support and manipulate the patient's head to facilitate introduction of the endoscope. The assistant should also monitor the patient's vital signs and suction the oropharynx as needed to protect the patient's airway. The assistant also can help with various therapeutic maneuvers including biopsies and polypectomies.

After patient preparation and checking that the equipment is functioning well, the tip of the endoscope is lubricated (by using xylocaine jel) and advanced into the patient's esophagus by one of two techniques. The preferred method of intubation is under direct vision. The endoscope is advanced through the center of a previously placed mouthpiece, over the tongue, and past the epiglottis to the cricopharyngeal sphincter. The patient is then instructed to swallow which relaxes the cricopharyngeus muscle, allowing entry into the esophagus.

Some patients may reveal difficulty in intubations; therefore, the blind method in introduction the endoscope was used [49].

This method performed by depressing the tongue with the second and third fingers of the left hand allows the endoscope to be placed at the cricopharyngeus muscle. The mouthpiece is then positioned, continuing the procedure as described below. This latter technique is less frequently used because of the risk of injury to patient, endoscopist, and endoscope.

The examination continues under direct vision, advancing the instrument towards an open lumen to the desired level. As the scope is advanced, the mucosa is carefully inspected noting anatomic landmarks and their distance from the incisors. Important landmarks include the 'Z-line', the lower esophageal sphincter, the cardia, the incisura, the pylorus, and superior duodenal angle. To determine

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

the diaphragmatic indentation we use the ``sniff test`` by asking the patient to cough to contract the diaphragm [43].

3. THE RESULTS

The findings that were obtained from this study could be designed as follows:-

3.1 Esophagus

3.1.1 Constrictions of the esophagus:

There is no true constriction in the wall of the esophagus, just at the beginning (cricopharengeus sphincter) and at its end (gastro-esophageal sphincter). Otherwise; we get indentation in the wall of the esophagus from the neighboring structures, as following:

- The cricopharyngeus constriction is always almost at 15 cm. from the incisors teeth.
- There is no true aortic constriction; we just notice the pulsation between 22 cm. - 25 cm. from the incisor teeth according to the patient condition (as in patients' hading hypertension).
- There is no bronchial constriction if it is not enlarged (pathological enlargement like a tumour).
- The diaphragmatic constriction is not noticed unless we use the `sniff test` about 1 – 2 cm. from the cardia.

3.1.2 Length of esophagus:

The length of the esophagus from the cricopharyngeus to the cardiac orifice and its relation with the body length, revealed in this study could be summarized in table (3-1).

Table (3-1): The length of the esophagus, length of the patients and the number of the cases.

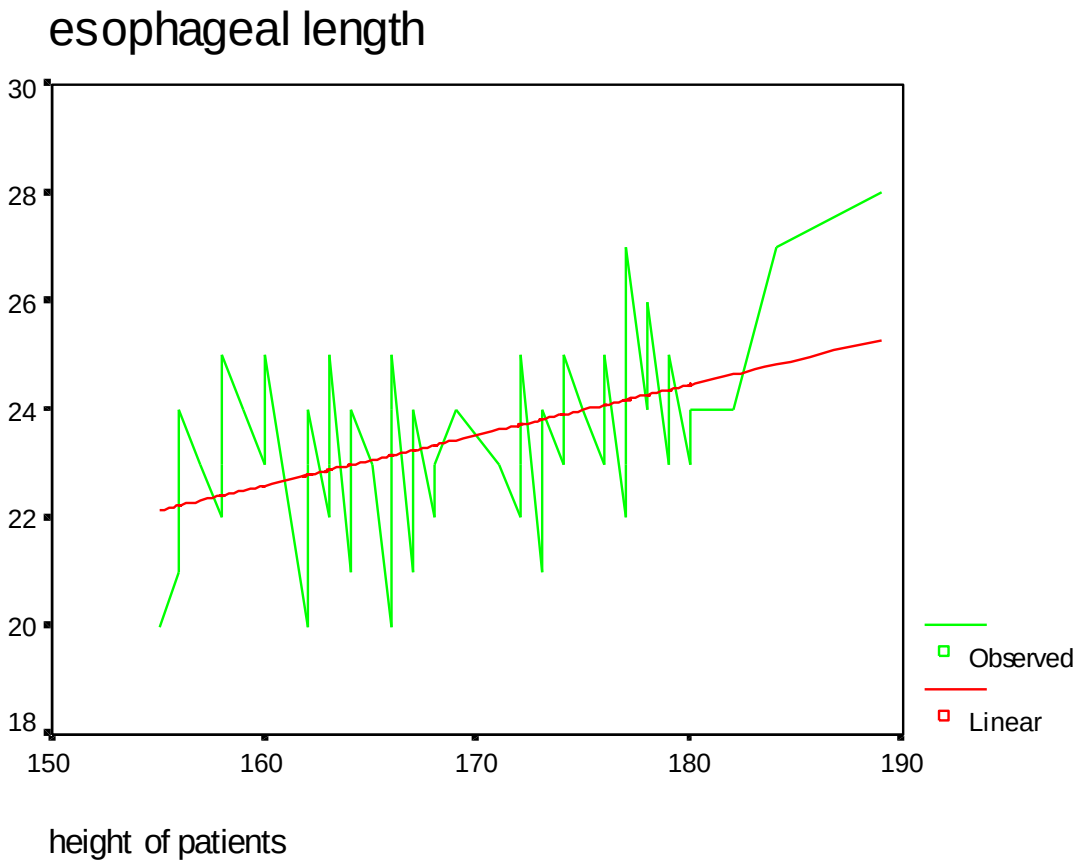
Length of the esophagus	Length of the patients	Average of the body length	Cases No.
• 20 cm.	155 cm.	161 cm.	3
	162 cm.		
	166 cm.		
• 21 cm.	156 cm.	165 cm.	4
	164 cm.		
	167 cm.		
	173 cm.		
• 22 cm.	158 cm.	167.6 cm.	5
	163 cm.		
	168 cm.		
	172 cm.		
	177 cm.		
• 23 cm.	157 cm.	168.7 cm.	14
	158 cm.		
	160 cm.		
	162 cm		
	163 cm.		
	165 cm.		
	168 cm.		
	171 cm.		
	172 cm.		
	174 cm.		
	176 cm.		
	177 cm.		
	179 cm.		
	180 cm.		

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

• 24 cm	156 cm. 159 cm. 162 cm. 164 cm. 166 cm. 167 cm. 169 cm. 173 cm. 175 cm. 178 cm. 180 cm. 182 cm.	169.25 cm.	12
• 25 cm.	158 cm. 160 cm. 163 cm. 166 cm. 172 cm. 174 cm. 176 cm. 179 cm.	168.5 cm.	8
• 26 cm.	178 cm.	178 cm.	1
• 27 cm.	177 cm. 184 cm.	180.5 cm.	2
• 28 cm.	189 cm.	189 cm.	1

Total = 50

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644



Graph (3-1): The frequency distribution of esophagus length from the the cricopharyngeus to the cardiac sphincter in 50 patients by endoscopic examination.

The equation of straight line:
Y = a + bX
a = Y intercept
b = constant (amount of change in Y per unit change in X)

Y = 7.738 + 0.0929X

The descriptive statistics of the lengths of esophagus and the heights of patients obtained by " SPSS" (program "statistical package of social sciences")

Table (3-2): The descriptive statistic of the esophageal length from the cricopharyngeus to the cardiac sphincter in 50 patients.

	Descriptive Statistics				
	Minimum	**Maximum**	**Mean**	**Std. Deviation**	**N**
height of patient	**155.00**	**189.00**	**169.0000**	**8.4491**	**50**
esophageal length					

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

Valid N (list wise)	**20.00**	**28.00**	**23.4400**	**1.7398**	**50**
					50

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.451[a]	.204	.187	1.5687

a. Predictors: (Constant), ht of pt

Regression coefficient "R" value obtained by "SPSS" was 0.45; means that the relation between the length of esophagus and the height of patient in the studying sample was moderate

Because according to "SPSS" program "R" value ranges between (0-1), so if it was (0-0.3) mean that the relation is weak .If it was (0.3-0.7), means that the relation is moderate and if it was (0.7-1) means that the relation is strong.

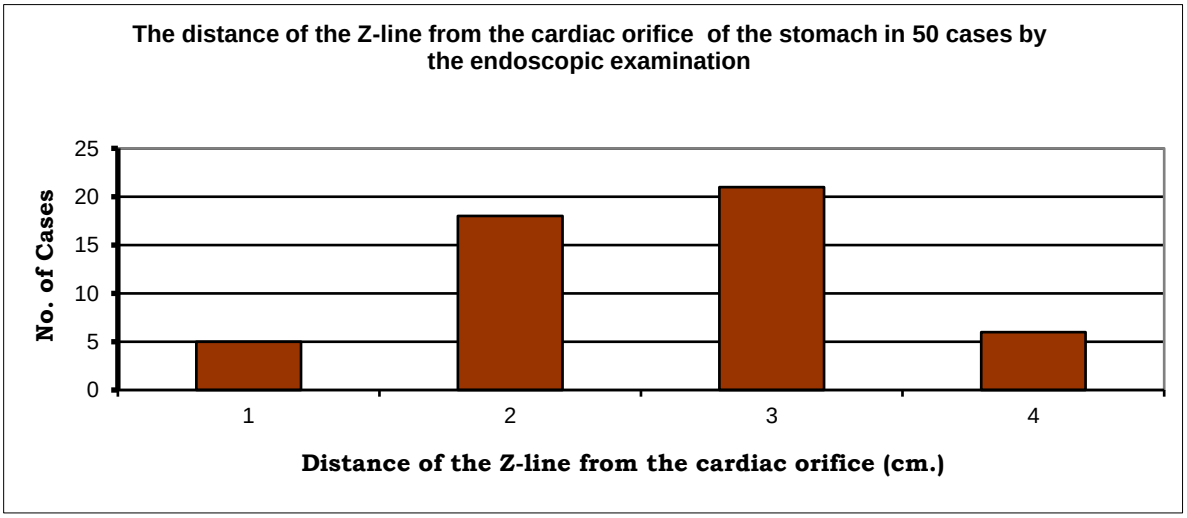
3.1.3 Z –line of the esophagus:

The distance of the Z-line of the esophagus from the cardiac orifice could be summarized in table (3-3).

Table (3-3): The distance of the Z-line from the cardiac orifice, the body length and the cases numbers.

Distance of the Z-line from the cardiac orifice	Length of the body	Cases No.
1 cm.	163-178 cm.	5
2 cm.	156-180 cm.	18
3 cm.	158-189 cm.	21
4 cm.	155-174 cm.	6

Total = 50



Graph (3-2): The frequency distribution of the distance of the Z- line from the cardiac orifice by endoscopic examination in 50 patients.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

Table (3-4): The descriptive statistic of Z-line distance from the cardiac orifice.

Descriptives Statistic of Z-Line		Std. Error
Mean	2.5	0.645497
Median	2.5	
Variance	1.666667	
Std. Deviation	1.200994	
Minimum	1	
Maximum	4	
Range	3	

3.1.4 Hiatus Hernia (sliding type):

Twelve cases from fifty one had sliding hiatus hernia at the endoscopic examination, as in table (3-5).

Table (3-5): The number of cases had sliding hiatus hernia with the percentage of males and females.

Total number of patients	Patients had sliding hiatus hernia	Male patients	%	Female patients	%
50	12	4	33.33	8	66.66

3.1.5 Reflux esophagitis: (27) cases of fifty one submit to the endoscopic examination in our study had reflux esophagitis. Reflux esophagitis had been found in our examination accompanied by:-

- Patients had dudenitis: 14 cases.
- Patients had incompetent cardiac sphincter: 9 cases.
- Patients had hiatus hernia: 5 cases.
- Patients had B- line: 3 cases.
- Patients had web rings: 2 case

Note: More than pathology of these mentioned above pathology could be seen in one patient.

4. DISCUSSION

In this chapter, we will discuss the endoscopic finding of the upper gastrointestinal tract separately and as follows:

4.1 Esophagus

4.1.1 *Esophageal constrictions:*

In this study, the only constant constriction could be shown endoscopically was the cricopharyngeal sphincter at the beginning of the esophagus (15 cm. from the incisors teeth), this constriction is a real one since the cricopharyngeus muscle form a circular band around the beginning of the esophagus. This agrees with Last's (1), Gray's (2), Moffat (23), Snell (24) Skandalakis (26) and Ellis (45).

The second true constriction is at the gastro-esophageal sphincter, this ensure the finding mentioned in Last's (1), Gray's (2), Moffat (23), Snell (24), Skandalakis (26) and Ellis (45).

Last's (1), Gray's (2), Moffat (23), Snell (24), Skandalakis (26) and Ellis (45) consider that the esophagus had 3-4 constrictions, these are in sequence, aortic, left bronchus, left atrium if dilated and the esophageal opening in the diaphragm.

These constrictions are not real one since they disappear when the esophagus is empty, this agrees with Moore (46). What noticed during endoscopic examination is the aortic pulsation on the left side of the esophagus (which it is obviously seen in elderly and in hypertensive patients).

Bronchial indentation could be recognized during endoscopic examination only when the esophagus is fully dilated by the air inflated from the endoscope, like in barium-swallow during radiological examination of the esophagus then the bronchial indentation could appear also, and this agree with Torsten (47).

These previous constrictions are not true constrictions as described by Last's (1), Gray's (2), Moffat (23), Snell (24), Skandalakis (26) and Ellis (45), but they consider as an indentation or compression in the wall of the esophagus, and this agree with Lee McGregors (25), because these organs (aorta and the left bronchus) are in close contact with the esophagus, so when the esophagus was dilated, its wall will be embenched by these structures i.e. when the esophagus become empty, all these constrictions will disappear as mentioned is Moore (46).

Regarding the diaphragmatic opening, the endoscopist cannot be able to identify it unless the patient did the `sniff test` as mentioned in Timothy Simon and Aaron (34), i.e. cannot different endoscopically between the thoracic part from the abdominal part of the

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

esophagus unless the diaphragm is contracted and compress the esophagus.

4.1.2 *Length of the esophagus:*

Up to our knowledge, no research was study the correlation between the heights of the human being (precisely the thorax) with the length of the esophagus.

In our study, we take this point in our considerations and the result obtained from this study revealed that: there is a moderate relation-ship between the height of the body and the length of the esophagus. In, another hand tall stature and short stature people have the same mean length of the esophagus. This was shown clearly in (table 3-1, 2 and graph 3-1). Yet the cause that the tall and short statures people in most of cases have almost the same length of the esophagus is still obscure.

Besides the average length of esophagus was 23.4 cm. (from the cricopharyngeus till the cardiac orifice) in Iraqi people. This disagrees with Last's (1) and Gray's (2) who consider the esophagus length is 25 cm. from the cricopharyngeus.

4.1.3 *Z – line of the esophagus:*

The endoscopic examinations of the lower third of the esophagus in 50 patients reveal that the mean distance of the Z – line of the esophagus from the cardiac orifice is 2.5 cm. with minimum 1 cm. and maximum 4 cm. This finding disagree with Last's (1), Lee McGregor`s (25) and Skandilakis (26) who describe the distance of the Z – line as 1 cm. from the cardiac orifice, and agrees with Groher, Michael E (39) who describe the distance of the Z – line as 2–3 cm. from the cardiac orifice.

4.1.4 *Sliding hiatus hernia and Reflux esophagitis:*

As we notice in table (3.5) the percentage of sliding hiatus hernia in female is twice than in male.

According to the reflux esophagitis in patient having sliding hiatus hernia only 5 cases from 12 cases having reflux esophagitis, so we suggest that the lower esophageal musculature and its resting tone is more important factor than the intra-abdominal pressure on the abdominal segment of the esophagus. According to these facts we disagree with Lee McGregor`s (25) who consider the mechanism at the cardia preventing the reflux esophagitis, and also according to these facts we agree with Skandilakis (26), Ronald A. Hinter, Charles J. Filipi, and Gerold J. Wetscher (27) when they consider the lower esophageal muscle has a resting tone, which is more important than other factors in preventing reflux esophagitis.

From 27 cases having reflux esophagitis; 14 cases having duodenitis without anatomical abnormalities and this is due to a physiological cause which it is related to low PH of the gastric secretion which is one of the important factors as mentioned by Kenneth R. McQuaid (37).

4.1.5 *B-line, Web ring, and esophageal contraction:*

We must differentiate the B-line and the web ring from the esophageal contraction and from each other, the B-line or the Schatzki ring must be at the Z-line as a result of chronic reflux esophagitis and it's fixed in its position at the Z-line causing dysphagia and differ from the acquired web ring which result also from chronic reflux esophagitis but its position at mid part of the esophagus which may be disappear or ruptured during examination. The esophageal contraction sometimes appear as esophageal ring especially when there is a spasm but it's a movable ring move as result of the peristaltic movement from upward to downward and then disappear and some times it's difficult to differentiate from the web ring and sometimes also from the B-ring, so we must give the patient a muscle relaxant as diazepam and buscopan ampules. These findings agree with Castell, Donald (40) and Gore RM, Levine MS (41) in their description to the B-line and with Chisholm M. (42) in his description to the web ring.

4.1.6 *Barrett's esophagus:*

It is well known that the Z-line is the transitional line between esophageal and gastric epithelium. Continuous exposure of the esophagus to the gastric juice due to reflux esophagitis leads to Barrett's esophagus which leads to metaplasia of the esophageal epithelium. This metaplasia classify Barrett's esophagus into short one (tongue like protrusion above the Z-line and less than 3 cm. i.e. less than 5.5 cm. from the cardia), and long one (tongue like protrusion above the Z-line and more than 3 cm. i.e. more than 5.5 cm. from the cardia). This finding agrees with Groher, Michael E (39) and Castell, Donald, O. (40) and disagree with Last`s (1) and Skandalakis (26).

CONCLUSION

1. There are no true constrictors in the wall of esophagus, but there are many indentations caused by compression of the closely related structure to the esophagus.
2. There is a moderate relationship between the height of the body and the length of the esophagus. The average length of the esophagus in Iraqi people is 23.4 cm. from the cricopharyngeus to the cardiac orifice.
3. Z-line located averagely 2.5 cm. proximal to the cardiac orifice of the stomach.
4. The lower esophageal musculature (anatomical factor) has the major role in preventing the reflux esophagitis than the physiological factor.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

5. The incidence of hiatus hernia in female is double that in male.
6. Duodenitis usually associated with reflux esophagitis.
7. Duodenitis always involves the first part of duodenum, and if sever, second part could affected.

FURTHER SUGGESTION

1. Histological study of the epithelium lining of esophagus especially above, at and below Z-line, and to be more informative, this study done during pathological condition (reflux esophagitis, hernia, etc...).
2. Study the correlation between duodenitit and the reflux esophagitis. This is better study with the help of physiologist.
3. Examine the midgut and the hindgut endoscopically.

REFERENCES

1. Last R.J: Anatomy regional and applied, 8th edition. Churchill Livingstone, Edinburgh. (1999), PP: 201-202, 241-242.
2. Williams P.L.: Gray's anatomy, 38th edition. Churchill Livingstone, Edinburgh. (1999) pp: 1751-1763.
3. Sadler T.W: Langman's medical embryology, 8th edition. Williams and Wilkins, Baltimore. (2000) PP: 273-283.
4. MacDonald W C, Trier J S, Everett N B: Cell proliferation and migration in the stomach, duodenum and rectum of man, radioautographic studies. Gastroenterology (1964), 46: 405–417.
5. Frank H. Netter, M.D.: Atlas of Clinical Anatomy. Novartis, (1998) CD version.
6. Junqueira L.C., Jose Carneiro J. and Kelley. R.O.: Basic Histology 6th edition. Prentice-Hall, London. (1989) PP: 290-297.
7. Hopwood D, Milne G, Jankowski J, Howat K, Johnston D, Wormsley K G: Secretory and absorptive activity of esophageal epithelium: evidence of circulating mucosubstances. Histochem J. (1994), 26: 41049.
8. Roger C. Hoversland URL: http://histo.ipfw.edu/histo-embryo/epithelia.html accessed on (June /2004).
9. Orlando R C, Lacy E R, Tobey N A, Cowart K: Barriers to paracellular permeability in rabbit esophageal epithelium. Gastroenterology. (1992), 102: 10–23.
10. Vaithilingam U D, Wong W C, Ling E A: Light and electron microscopic features of the structure and innervation of the gastro-esophageal junction of the monkey (Macaca fascicularis). J. Anat. (1984), 138: 471–484.
11. Zaninotto G, DeMeester T R, Schweitzer W: The lower esophageal sphincter in health and disease. Amer J. Surg. (1988), 155: 104–111.
12. Ferrarini F, Longanesi A, Baldi F: Pathophysiology and pathogenesis of reflux esophagitis. Gullet. (1993), 3: 11–19.
13. Geboes K, De Wolf-Peeters C, Rutgeers P, Janseen J, Van Trappen J, Desmet G: Lymphocytes and langerhans cells in human esophageal epithelium. Virchow's Arch. (1983), 401: 25.
14. Hopwood D, Coghill G, Sanders D S A: Human esophageal mucosal glands. Their detection, mucin, enzyme and secretory protein content. Histochemistry. (1986), 86: 107–1120.
15. Whitmore I: Esophageal striated muscle arrangement and histochemical fibre types in guinea-pig, marmoset, macaque and man. J. Anat. (1982), 134: 685–695.
16. Ito S, Winchester R J.: The fine structure of the gastric mucosa in the bat. J Cell Biol. (1963), 16: 541–577.
17. Piasecki C, Thrasivoulou C, Rahim A: Ulcers produced by ligation of individual gastric mucosal arteries in the guinea pig. Gastroenterology. (19 97), (5): 1121–1129.
18. J. Misiewisz BSc, Alastair Forbes, Ashley Price: Clinical Gastroenterology. (1996), CD version.
19. G.J Romanes: Cunningham's Manual of Practical Anatomy, 6th edition, Volume two. Oxford Medical Publications. New York. (1996), PP: 139.
20. William F. Ganong: Review of Medical Physiology, 18th edition. Prentice-Hall International, New Jersey. (1997), P: 471.
21. Mann, Russell and Williams: Bailey and Love's, Short Practice of Surgery, 22nd edition. Chapman and Hall Medical, London. (1995), PP: 641-656.
22. J. Wiley (January 11, 2002): Lecture transcription, General surgery, gastrointestinal tract and Liver, CD version.
23. D.B Moffat: Lecture Notes on Anatomy. Blackwell Scientific Publications. (1987), PP: 196-197, 228-229.
24. Richard S. Snell.: Clinical Anatomy for Medical Students, 7th edition. Little, Brown and Company. Boston. (2003), PP: 229-233, 239-243.
25. G.A.G. Decker: Lee McGregor`s Synopsis of Surgical Anatomy. 12th edition. Wright Bristol. (1986), PP: 3-9, 160-161.
26. Skandalakis, J.F, Gray S.W, Row J.S: Anatomical complication in general surgery,

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-13, August 2022
ISSN: 2749-3644

1st edition. McGraw-Hill Book Company, New York. (1983), PP: 55-56.
27. Ronald A. Hinter, Charles J. Filipi, and Gerold J. Wetscher: Operative Laparoscopy and Thoracoscopy. Lippincott-Raven Publishers, Philadelphia. (1996), PP: 598-602.
28. Adams, H. D; and A. W. Loob: Esophagoaortal hiatus hernia, N. Engl. J. Med. (1954), 250: 143.
29. Angelchik. J. P. and R. Cohen: New surgical procedure for treatment of gastroesophageal reflux and hiatal hernia. Surg. Gynecol. Obestet. (1979), 148:246.
30. Gahgan, T.: The function of the musculature of the esophagus and stomach in the esophagogastric sphincter mechanism. Surg. Gynecol. Obestet. (1962), 114:293.
31. Hayward, J.: The lower end of the esophagus, Thorax. (1961), 16:36.
32. Hill, L. D., J. Tobias, and E. H. Morgan: Newer concepts of the pathophysiology of hiatal hernia and esophagitis. Ann. Surg. (1966), 111:70
33. Moore K, Persand T.V.N.: Clinically oriented anatomy, 6th edition. W.B Saunder company. Philadelphia. (1998), PP: 221-242.
34. Mcvay and Anson: Surgical anatomy, 6th edition. Vol-1, W.B Saunders company, Philadelphia. (1984), PP: 609-616.
35. http://www.barrett`sinf.com/ (22/6/2004).
36. Copyright© 2002 Up-To-Date® • www.uptodate.com • (800) 998-6374 • (781) 237-4788
37. Kenneth R. McQuaid: Current Medical Disease and Treatment, 37th edition. Appleton and Lange. (1998), CD version.
38. Upper endoscopy - The Doctors Lounge(TM). Copyright © 2001-2004. @hotmail.com. (June 05, 2004).
39. Groher, Michael E.: Dysphagia*: Diagnosis and Management,* 3rd edition. Boston: Butterworth-Heinemann. (1997).
40. Castell, Donald, O.: The Esophagus, 2nd edition. Boston: Little, Brown, (1995), CD version.
41. Gore RM, Levine MS: Textbook of Gastrointestinal Radiology. Philadelphia: WB Saunders Co; (2000), 487-8, CD version.
42. Chisholm M. The association between webs, iron and post-crycoid carcinoma. Post graduate Medical Journal (1994).
43. Timothy Simon and Aaron S. Fink: Oxford Textbook of Surgery, 2nd edition. Oxford University Press 2002, Oxford. (2002), CD version.
44. (Adapted from Standards of Practice Committee. Appropriate Use of Gastrointestinal Endoscopy. American Society of Gastrointestinal Endoscopy, Manchester, MA, 1992.)
45. Harold Ellis: Clinical Anatomy. A revision and applied anatomy for clinical students, 8th edition. Blackwell Scientific Publications Paris. (1992), PP: 46.
46. Moore K.: Clinically oriented anatomy, 4th edition. Williams and Wilkins, Baltimore. (1985).
47. Torsten B. Moller, Emil Reif: Radiographic Anatomy, 2nd edition. Gastrointestinal system, Thieme. (2000), P: 229.
48. Gadour MO, Ayoola EA.: Barrett's esophagus and esophageal cancer in Saudi Arabia. Gastroenterology; (1999), 20:111–5.
49. Official Patient and Family Web Site of the Society of Critical Care Medicine, (July 7, 2004).
50. Arlene Fink, Katherine L. Kah.: Indication for selected Medical and Surgical procedures – A literature Review and Rations of Appropriateness. Diagnostic Upper Gastrointestinal Endoscopy. Chapter 3, The Rand Corporation. (1986), PP: 10-11