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CALOT'S TRIANGLE IS NOT CYSTOHEPATIC TRIANGLE. A REVIEW OF LITERATURE

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ABSTRACT

Calot's triangle is an anatomical landmark of paramount value in cholecystectomy. Jean-François Calot (1861-1944) was a French Surgeon who in 1891 described an isosceles triangle in his doctoral thesis which continues to be of great utility during surgery to avoid damage to biliary tree and vasculature till date.

The modern definition of the boundaries of Calot's triangle varies from Calot's original description, although the exact timing of this change is not entirely clear.

According to the original description of Calot, the boundaries of the triangle were formed by cystic duct, common hepatic duct and cystic artery. A minor translation error from French to English somehow made inferior surface of the liver as one of the border. Although rectified in subsequent translations, the erroneous description of boundaries found its way in many of the publications that lead to a confusion in original description of Calot's triangle. Despite being recognized, few literatures still continue to follow the initial translation to this day. This review of literatures was made in an effort to recognize the confusion behind the boundaries of Calot's triangle.

AIM:

This study aimed to review the widely used anatomical textbook literature on the description of boundaries of Calot's triangle and its accuracy with the original description.

METHODS:

Calot's original description of the triangle was as follows:

''Le triangle n'est pas exactement equilateral, mais plutôt isoccle, les deux côtés supérieur et inférieur, représentés par l'artčre et le conduit cystique, étant seuls égaux, et un peu plus longs que la partie du canal hépatique qui entre dans la constitution du triangle''.

It was initially translated as "The triangle is not exactly equilateral; the superior and inferior sides, represented by the cystic duct, are equal and slightly longer than the side of the triangle made up by the hepatic duct". This translation was widely accepted although it remained inaccurate.

Later it was accurately translated to ''The triangle is not exactly equilateral, but rather isosceles, the two superior and inferior sides represented by the cystic artery and the cystic duct, being equal and a little longer than the part of hepatic duct.''

The former translation was followed in many of the publications that lead to a confusion in Calot's description. Despite being recognized, few literatures still continue to follow the initial translation to this day. A systematic search undertaken to thoroughly evaluate the description of Calot's Triangle in widely used anatomy textbooks, surgical textbooks. 10 widely used textbooks were reviewed regarding the boundaries of the Calot's triangle and their accuracy to the original description.

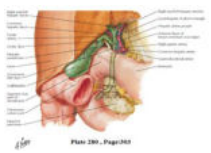
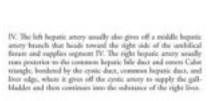
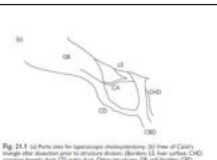
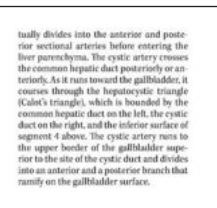
RESULTS:

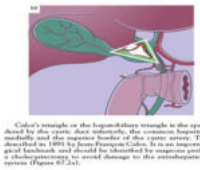
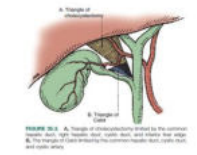
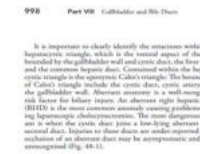
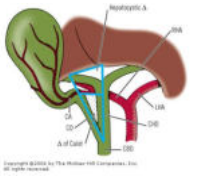
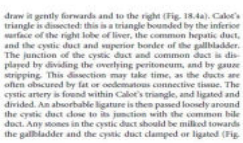
Commonly used anatomy and surgical textbooks were reviewed. 6 out of 10 textbooks have , 'Sabiston's textbook of surgery', 'Schwartz principles of Surgery', 'Fischer's mastery of surgery',' Farquharsan's Book of Operative Surgery' 'Netter's Atlas of Human Body and 'Oxford handbook of clinical surgery' have inaccurately described the inferior border of the liver as one boundary of Calot's Triangle instead of the cystic artery. Other widely used textbooks (Bailey & Love, Maingot's, Blumgart's and Skandalakis) have rightly mentioned cystic artery as one of the boundary of Calot's Triangle. Blumgart and Skandalakis even described the difference between Calot's triangle and cystohepatic triangle with illustrations.

CONCLUSION:

The Calot's Triangle has been confused with cystohepatic triangle in 6 of the 10 published literature. This could be attributed to the error in initial translation of Calot's description. The boundaries of Calot's triangle are Cystic duct, Cystic Artery and Hepatic Duct with content as **cystic lymph node of lund** or **Mascagni's** lymph node whereas the boundaries of Cystohepatic triangle are cystic duct, hepatic duct and inferior surface of the liver with Calot's triangle as its content. This error has to be rectified and recognized while teaching and imparting knowledge to the younger generation.

Chart 1: Accuracy of Boundaries of Calot's Triangle in different published literatures.

TEXTBOOK	*EDITION*	*DESCRIPTION*	*ACCURACY*
Netter's Atlas of Human Body	Edition: 6 Plate 280, Page number: 303		Inaccurate
Sabiston Textbook of Surgery	Edition 20		Innacurate
Oxford Handbook of Clinical Surgery	Edition: 4		Innacurate
Fischer's Mastery of Surgery	Edition: 6	 tually divides into the anterior and posterior sectional arteries before entering the liver parenchyma. The cystic artery crosses the common hepatic duct posteriorly or anteriorly. As it runs toward the gallbladder, it courses through the hepatocystic triangle (Calot's triangle), which is bounded by the common hepatic duct on the left, the cystic duct on the right, and the inferior surface of segment 4 above. The cystic artery runs to the upper border of the gallbladder superior to the site of the cystic duct and divides into an anterior and a posterior branch that ramify on the gallbladder surface.	Inaccurate

Bailey & Love's Short Practice of Surgery	**Edition: 26, Page : 1098** 	**Accurate**
Blumgarts Surgery of the Liver, Pancreas and Biliary Tree.	Edition: 6 	Accurate
Maingot's Abdominal Operations	Edition: 12 	Accurate
Skandalakis – Surgical Anatomy	International Students Edition (2004) 	Accurate
Farquharsan's Book of Operative Surgery	Edition: 10 	Innacurate
Schwartz Principle of Surgery	Edition: 10 	Innacurate

REFERENCES

1. Netter's Atlas of Human Body, 6th Edition
2. Sabiston Textbook of Surgery, 20th Edition
3. Oxford Handbook of Clinical Surgery, 4th Edition
4. Fischer's Mastery of Surgery, 6th Edition
5. Bailey & Love's Short Practice of Surgery , 26th Edition
6. Blumgarts Surgery of the Liver, Pancreas and Biliary Tree, 6th Edition
7. Maingot's Abdominal Operations, 12th Edition
8. Skandalakis- Surgical Anatomy, International Students Edition (2004)
9. Farquharsan's Book of Operative Surgery, 10th Edition
10. Schwartz Principle of Surgery, 10th Edition
11. Darmarajah Veeramootoo. Calot's triangle. A common misconception of basic anatomy / International Journal of Surgery 10 (2012) 0929
12. Abdalla S1, Pierre S, Ellis H. Calot's Triangle 2013 May;26(4):493-501 [pubmed]