East African Scholars Journal of Medicine and Surgery
Abbreviated Key Title: EAS J Med Surg
ISSN: 2663-1857 (Print) & ISSN: 2663-7332 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-6 | Issue-2 | Feb-2024 | DOI: 10.36349/easjms.2024.v06i02.010

Case Report

Omentum a Powerful Viable Organ in Patient with Liver Crash Trauma: A Case Series

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Article History
Received: 17.12.2023
Accepted: 24.01.2024
Published: 20.02.2024

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: The Omentum is a large flat adipose tissue layer nestling on the surface of the intra-peritoneal organs. Besides fat storage, omentum has key biological functions in *immune-regulation* and *tissue regeneration*. Omentum biological properties include neovascularization, haemostasis, tissue healing and regeneration and as an *in vivo* incubator for cells and tissue cultivation. Some of these properties have long been noted in surgical practice and used empirically in several procedures. we did 5 pedicular omental flap in 5 patients to prepare hemostasis in trauma with liver crash after resection and repairs.

Keywords: Omentum, Trauma, Liver resection, Liver trauma.

BACKGROUND

The Omentum is a large flat adipose tissue layer nestling on the surface of the intra-peritoneal organs. Besides fat storage, omentum has key biological functions in *immune-regulation* and *tissue regeneration*.

Omentum biological properties include Neovascularization, homeostasis, tissue healing and regeneration and as an *in vivo* incubator for cells and tissue cultivation. Some of these properties have long been noted in surgical practice and used empirically in several procedures [1].

The *Omentum* either *Epiploon* [epipleen in Greek means floating] or *Greater Omentum* is a large flat adipose tissue layer covered by visceral peritoneum that hangs down from the greater curve of the stomach floating on the surface of the intra-peritoneal organs, mostly small and large bowel. The *Lesser Omentum* connects the lesser curvature of the stomach and the proximal duodenum to the liver and defines the lesser sac Anteriorly. Its gastro-hepatic ligament contains the left gastric vessels with their lymph nodes. The hepato-duodenal ligament (the gate for the Winslow foramen) contains the portal vein, the hepatic artery, the extra-hepatic bile duct, and the hepatic lymph nodes group [2].

The omentum has a rich vascular supply in which capillaries form numerous characteristic spiral loops that are called *omental glomeruli* due to their similarity to renal glomeruli. These capillary beds lie directly under the mesothelium [3].

Surprisingly, the omentum is a very mobile organ; it moves around the peritoneal cavity dealing with infections and contaminants. It also deals with the control of the inflammation, promotes revascularization and tissue regeneration [4, 5].

Therefore, the omentum has been recognized as having an important role in the immune defense, specifically in the peritoneal cavity. It plays this role by adhering to sites of inflammation, absorbing bacteria and other contaminants, and providing leukocytes for the local immune response [6].

Several experimental studies have demonstrated that intra-peritoneal introduction of foreign particles can induce a dramatic increase in the omentum volume due primarily to growth factor

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activation and expansion of the Stromlo cell population [7, 8].

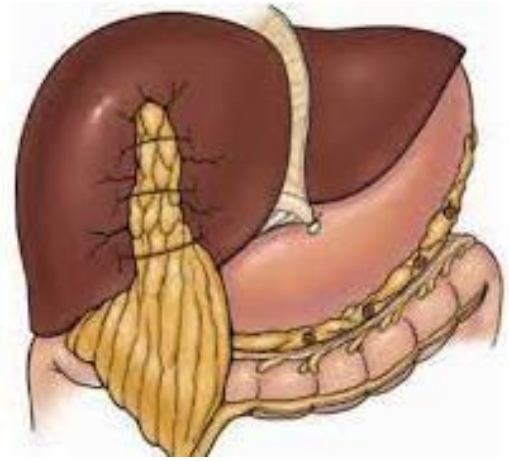

Figure 1: Example of this kind of omental usage [9]

CONCLUSION

In experimental peritonitis model, the omentum was the only abdominal organ that showed an increase in blood flow during peritonitis and abdominal sepsis [10].

The omentum supports early post-natal hematopoietic and lymphopoiesis and in experimental models, this ability continues throughout the rest of life [11].

There has been a longstanding surgical practice to rescue splenic function after total Splenectomy by implanting small pieces of spleen "spleen chips" in the omentum. Histophysiologies studies have proven that these implanted spleen chips not only survive but thrive [12].

In diabetes type 1 cases, Literature has reported that pancreatic islets have been injected into the portal vein with the aim to implant them into the liver. However, Literature has reported a very modest survival rate of these islets. The reasons for the low survival rate have been supposed to be poor blood supplementation and hostile extra-cellular micro environmental factors [13].

Therefore, it is reasonable to suppose that the omentum is capable of supporting free structures such as the trachea, esophagus and other tissue. These structures can be then used for reconstructive purposes [14-17].

Omentum is routinely used for the treatment of benign perforated gastric ulcer. Ulcer excision and omental patch closure are as effective as Gastrectomy. Likewise, in perforated duodenal ulcers, the Graham omental patch closure is a well known and commonly performed effective procedure [18].

The omental patch used for closing gastro-duodenal defects promotes the wound healing through the combined effects of neovascularization, granulation, scaffolding and fibrosis in order to regenerate a normal duodenal wall on the perforated site [19].

Some surgeons have applied transposed omentum to improve the homeostasis during liver resections and to line the bed of hydatid cysts in the liver [20].

It is an effective method to prevent the recurrence of diaphragmatic hepatic cyst after laparoscopic fenestration by packing the cyst with vascularized omentum [21].

Because of this effects of omentum, we did 5 Pedicular omental flap from Greater omentum in 5 patients with trauma and have liver crash trauma after resection and repairs, and we can control bleeding, made homeostasis and they discharged with normal liver activities in lab data.

DECLARATIONS

Ethical Approval and Consent to Participate:

The content of this manuscript are in accordance with the declaration of Helsinki for Ethics. No committee approval was required. Oral and written consent to participate was granted by the her husband.

Consent for Publication:

"Written informed consent was obtained from the patient's legal guardian for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal."

Availability of Supporting Data: It is available.

Competing Interests: The author declares that they have no competing financial interests and nothing to disclose.

Funding: There is no funding.

Authors' Contributions:

- Ahmad Reza Shahraki is the surgeon of patient and writes this paper.
- The author declares that they have no competing financial interests and nothing to disclose.

ACKNOWLEDGEMENTS

Only in uncommon circumstances of unclear imaging findings or deterioration in the patient's conditions, a diagnostic laparoscopy as a minimal invasive approach may settle the diagnosis and can be extended to a therapeutic maneuver**.**

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Cite This Article: Ahmad Reza Shahraki, Reza Abaee, Elham Shahraki (2024). Omentum a Powerful Viable Organ in Patient with Liver Crash Trauma: A Case Series. *East African Scholars J Med Surg*, *6*(2), 64-66.