



Clinical profile of patients undergoing thromboelastography and its effectiveness as a point of care diagnostic modality in hemostasis

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Abstract: - This retrospective case series evaluated the clinical profile of 61 patients who underwent thromboelastography (TEG) between June 2022 and July 2023 at a tertiary care center. The most frequent indication was perioperative monitoring during liver transplantation, followed by cytoreductive surgery with HIPEC. TEG provided dynamic insights into coagulation states, guiding transfusion decisions and resolving complex bleeding diatheses in unique scenarios. Novel recurring graphical patterns such as the “shallot sign,” “beetroot shoot,” “trophy sign,” and “pebbles on the street” were identified. Findings highlight TEG’s effectiveness as a point-of-care diagnostic modality in diverse hemostatic challenges..

Keywords: Thromboelastography, Hemostasis, Liver transplantation, Viscoelastic haemostatic assays, Point-of-care testing.



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Introduction

Thromboelastography is a technique for evaluating the effectiveness of whole blood coagulation. It gives a better picture in line with the cell based model of hemostasis. Although it is increasingly used in emergency rooms, critical care units, perioperative wards and labour room, the effectiveness of this POCT is not appreciated by the medical community.

AIM

In this case series we aim to

Primary Objective: To describe the clinical profile of patients for whom TEG was used at our Centre.

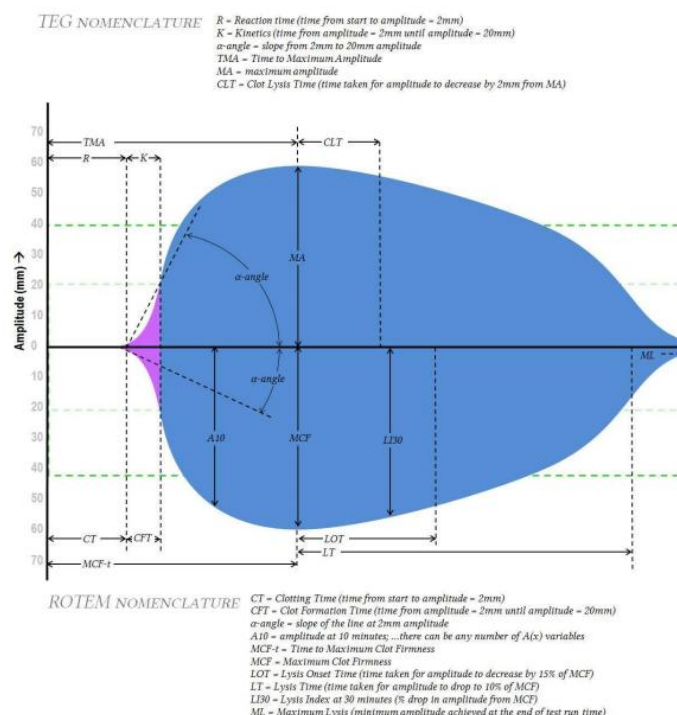
Secondary Objective: To describe the various patterns of TEG reports.

METHOD:

This was a retrospective collection of cases - Clinical history, indication for TEG and details of blood products given based on this report for all patient samples analysed with thromboelastography at our institute, between Jun 2022 to July 2023 were collected.

Sample Analysis: Citrated kaolin assay was performed at the Liver Transplant OT on calibrated Biotem 4T Haemostasis Analyser.

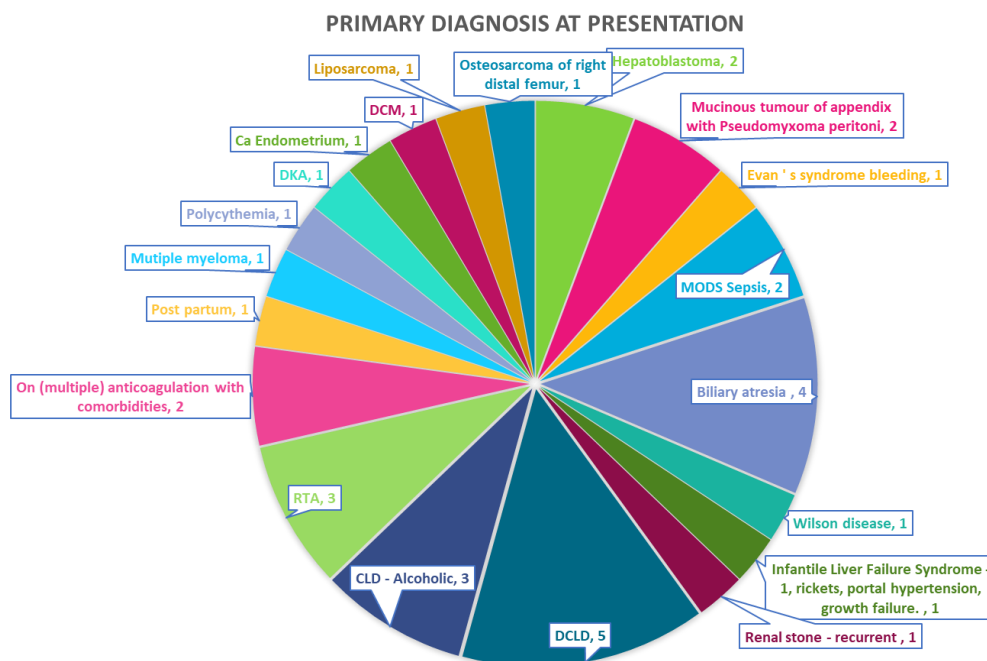
The TEG and ROTEM graphs, and differences in nomenclature

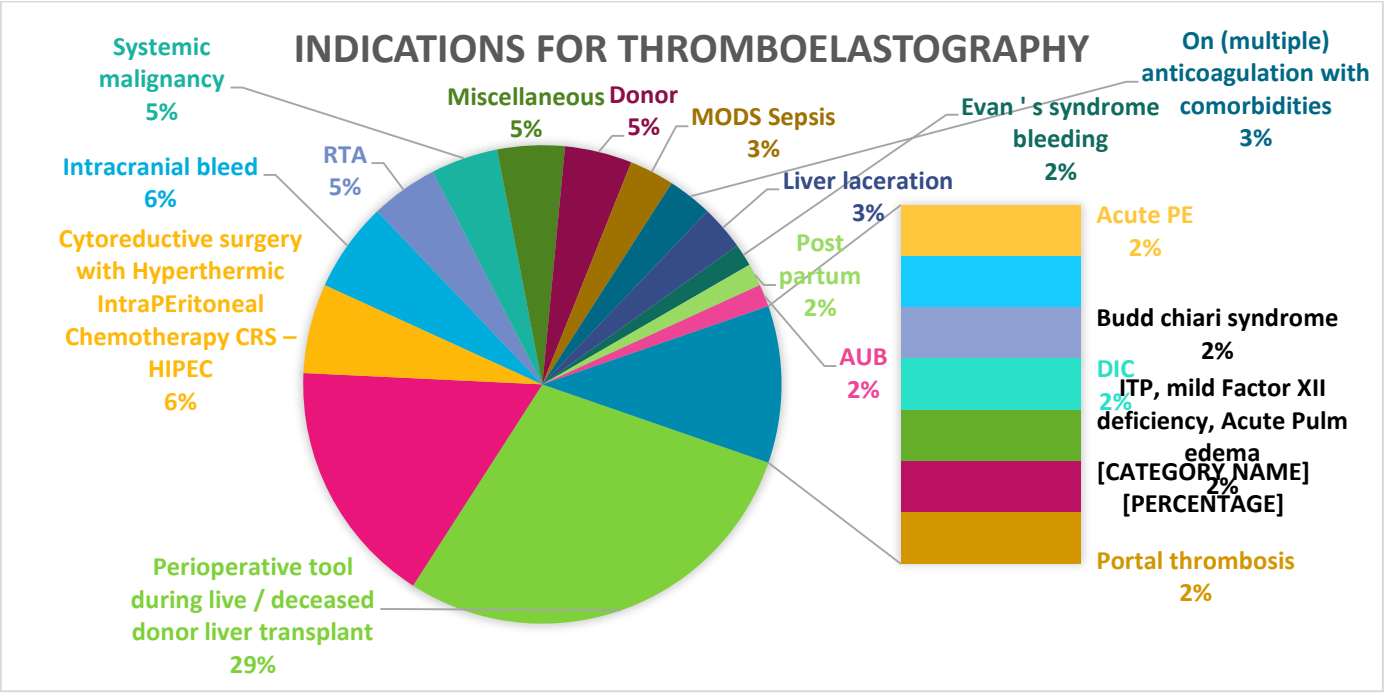


Results:

In this retrospective case series of about 61 patients (F: M = 21: 40) serial TEG monitoring of their dynamic coagulation profile was done in % of cases.

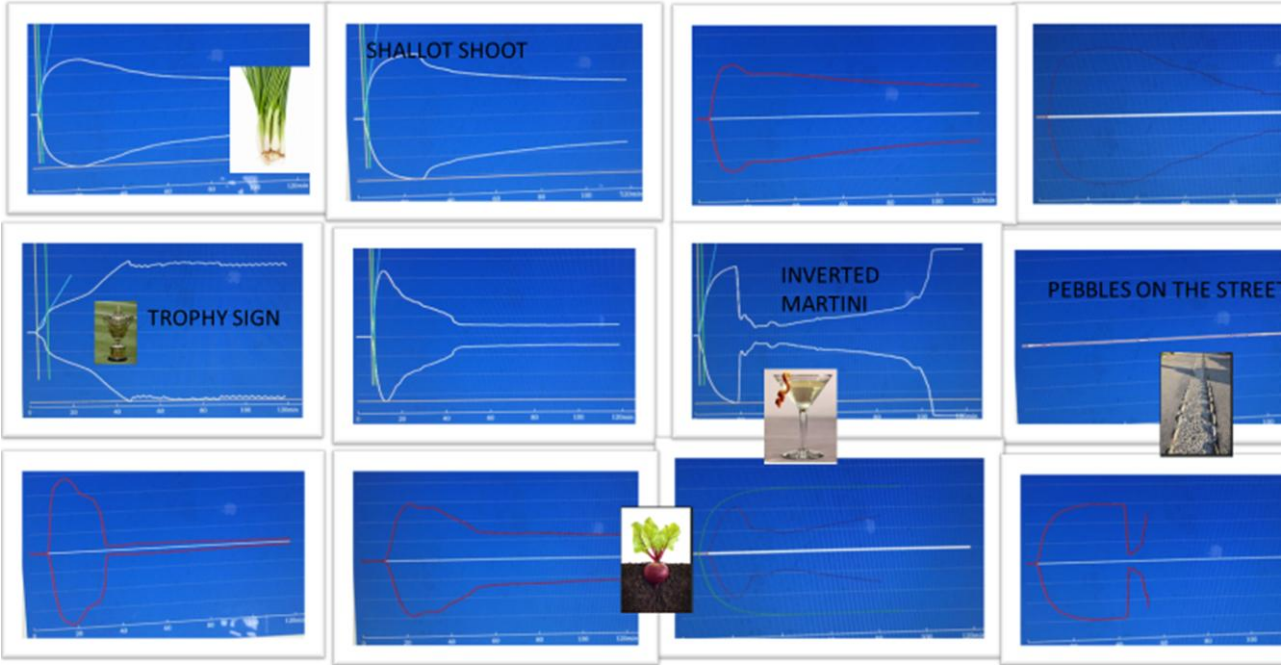
The age of patients ranged from 7 months to 73 years. The most common indication was as a perioperative tool during live / deceased donor liver transplant for various indications (24.6%) followed by cytoreductive surgery with Hyperthermic IntraPeritoneal Chemotherapy CRS – HIPEC (8.2%).





Interesting Case 1: A 47y old female, with history of multiple myeloma, post 4 cycles of VRD presented with mild epistaxis. She had MRSA positive sepsis. Conventional coagulation test were normal. VHA guided transfusion of 2PRBCs, 6 units of RDP and 10 units cryoprecipitate helped resolve her epistaxis.

Interesting Case 2: A 72 year old female with JAK2 exon14 mutation polycythemia was on Aspirin and dalteparin. She presented with right upper limb compartment syndrome requiring right upper limb fasciotomy and evacuation of hematoma. Procedure was completed with minimal bleeding with the support of FFP based on TEG reports.



Discussion:

The role of TEG / ROTEM in liver transplantation², cardiopulmonary bypass³ and trauma⁴ is well established. In a tertiary care cancer hospital TEG is a 'ready reckoner' option for solutions to complex hemostatic problems like occurrence of malignancy, cytopenia(s), multi – organ involvement, and hence possibilities of multiple coagulation protein derangements.

The inverted martini, red wine glass and test tube are signs described in literature.⁵ In our present study, we have noted the dynamic changes during the dissection, anhepatic and neo-hepatic phases of liver transplantation. We have noted few recurring patterns which we would like to describe as (a) **"shallot sign"** – sharp change in pattern to fibrinolysis at MA; (b) **"beetroot +/- shoot"** – quick clotting followed by hyperfibrinolysis. Another pattern of interest was the (c) **"trophy sign"** – slow onset of clotting followed by hypercoagulable state. (d) **"pebbles on the street"** – extremely hypo coagulable state.

STRENGTHS: Some unique clinical scenarios where the TEG resolved the bleeding diathesis were noted.

LIMITATIONS OF THE STUDY: The amount of blood products required during liver transplantation was less. However because of the retrospective nature of the study we were able to only quantify each type of blood product.

FUTURE DIRECTION: The dynamic changes of the graph during intraoperative VHA (TEG/ROTEM) provide time points where new dynamics of hemostasis may be identified.

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