

What are the challenges in DDLT considering Indian scenario (Deceased Donor Liver Transplant)?

- Lack of awareness among general public on organ donation
- Blood group matching is a big hurdle, as the pool of organ donors and recipients are relatively small
- When a patient is declared brain dead, despite losing their loved ones, counselling the family for organ donation is a sensitive issue
- Viability of organs after retrieval from the body
 - Heart & lungs = 4-6 hrs
 - Liver = 12-20 hrs
 - Pancreas = 12-24 hrs
 - Kidney = 48-72 hrs

Keeping this in view, faster transportation of organs is done from donor center to recipient center by creating GREEN CORRIDOR
- Educating the people on the necessity of organ donation, one person's donated organs will help 10 recipients to live
- Religious issues:
 - Islam does not permit organ donation
 - Some christian community is against organ donation

What has made DDLT a great success especially in Southern parts of India?

- JEEVANDAN: Started in 2013, it is a Government(Telangana & Andhra Pradesh) run programme with DME as chairperson
- At present Jeevandan programme is limited to Hyderabad, planning to set up zonal centers in all the district headquarters in a phased manner
- To create awareness on organ donation among all doctors across the state, particularly in districts and rural areas
- Doctors in turn should create awareness on organ donation among general public
- During awareness programmes they invite celebrities like film actors to spread the message on organ donation
- 23 major hospitals are registered with Jeevandan
- First phase in Hyderabad in 3 Govt.hospitals
 - NIMS(central unit): Organ donation and allocation
 - Osmania hospital(Training unit): To train transplant coordinators
 - Gandhi hospital(Awareness unit): To organise awareness programmes on organ donation

Achievements of Jeevandan

- About 13,058 donors from both TS & AP have registered with Jeevandan in the last 3 years by pledging to donate organs after death during awareness sessions, mostly by younger generation
- 882 organs were donated by 191 cadaveric donors in the last 3 years, 1830 recipients are still in waiting list(AB-125, A-418, B-569, O-718)
- Year wise organ donors: 2013=41, 2014=51, 2015=89
- No.of organs retrieved so far by Jeevandan:
 - Kidneys=332
 - Liver=188
 - Heart=16
 - Heart valves=148
 - Eyes=131
 - Lungs=04
 - Pancreas=03
 - Total = 822
 - Combined liver & kidney=04
 - Combined kidney & pancreas=03
 - Dual kidney=04

Programmes in other southern states

- Transplant authority committee of Tamilnadu: In Tamilnadu, government made it mandatory to declare all brain deaths to this committee. Hence cadaveric donation is more aggressive in TN
- Zonal coordination committee of Karnataka(ZCCK)
- SORT in Kerala
- MOHAN foundation: NGO – Conducts awareness programmes on organ donation among public and training sessions for transplant coordinators

Initially started in Chennai, Tamilnadu and spread to Telangana & Andhra Pradesh, Rajasthan, Delhi & Gurgaon, Madhya Pradesh and other northern states

Our center's experience

- Performed our first cadaveric liver transplantation on 13th Feb, 2003
- Out of 463 liver transplants
 - LDLT = 328
 - DDLT= 135
 - Split transplant = 01
 - Combined liver and kidney = 01

Out of 223 renal transplants

- Live donor renal transplants= 161
- Cadaveric renal transplants = 62

Heart transplants = 08

Can BTS play some role in motivating organ donation?

Can BTS play a role in organ donation?

- Yes, by educating blood donors on organ donation and motivating them to pledge for organ donation
- Displaying posters on organ donation both in blood bank and other areas of hospital and distributing pamphlets on myths of organ donation

- Donate organs and live even after death!!
- Let my sunset become sunrise for others,
Donate organs!!

Average Blood Requirement during a liver transplant procedure-experience of your center and comparison with other published data from Indian subcontinent

Average Blood Requirement at ILBS for LDLT (2013-2016)

- The blood usage data showed that the PRC, FFP, CRYO, SDP and RDP were 6,4,2, 1 and 0 on an average (median) respectively.
- There were 9 (6%) patients who needed more than 10 u of PRCs (a massive transfusion).

Data from other Centres

Medanta Delhi (2013, AJTS)

- PRBC 6
- FFP 4
- CP 0.1
- SDPC 0.3

Common pre-op predictors of blood transfusion in liver transplants

ILBS Data- Factors affecting transfusion requirements in LDLT

- Male gender,
- Warm ischemia time(min),
- Presence of ascites,
- Presence of SBP,
- High CTP score,
- High MELD score,
- High SBT and SBI levels,
- Fall in albumin levels,
- Increased s. globulin levels,
- Increased s. creatinine levels,
- Low Hb
- Increased INR

Variables	≤5 units of RC	>5 units of RC
Number	78	72
Gender (M/F)	60/18	61/11
Age(yrs)-Median (Range)	46(0.5-65)	46(1-78)
RC utilized-Mean±SD	3.12±1.34	9.07±3.36
FFP utilized-Mean±SD	3.37±2.15	5.58±3.05
SDP utilized- Mean±SD	0.10±0.31	0.56±0.78
Preoperative INR	1.94±1.19	1.90±0.61
Preoperative Hb (gm/dl)	10.31±1.47	8.12±1.12
Preoperative platelet count (10 ⁹ /L)	89.45±55.05	61.77±36.59
Preoperative APTT	39.80±12.66	41.86±11.29

Demographic and Haematological Variables of Recipients of Two Groups

**Role of blood transfusion services in
in making a successful liver transplant
program at an institute?**

- Providing safe and adequate blood
- Antibody reduction Incompatible Tx using TPE, DFPP, Glycosorb for Desensitisation.
- Monitoring antibody levels in ABO incompatible Tx
- ECP for GvHD

What are the different POC methodologies of intra-op coagulation and hemostasis monitoring?

Methodologies

- In patients presenting for liver surgery, **hemostasis differs from patient to patient**
- **Plasma based laboratory tests** and **whole blood based bed-side monitoring** are most commonly used
- Conventional tests
 - INR
 - aPTT
 - fibrinogen values
 - platelet count.
- Bed-side devices
 - Thrombelastography (TEG)
 - Thrombelastometry (TEM; ROTEM)

Monitoring- Conventional assays

- **APTT, PT/INR**- poorly reflect the whole coagulation system of the blood (unable to assess the procoagulant-anticoagulant balance)
- **Platelet count** - quantitative, unable to detect platelet function, or dysfunction
- **CCTs** are unable to detect fibrinolysis or clot stability, nor detect hypercoagulability
- **PT/INR and APTT** are sensitive to deficiencies of pro-coagulant factors – not the concomitant reduction of anti-coagulant factors (found in liver disease)
- **CCTs**- based upon plasma alone (not reflecting complete interaction between platelets, vascular endothelium, and fibrinolytic factors)
- **CCTs**- Turnaround time of more than one hour

Bedside assays (TEG and TEM)

- Both bed-side methods measure the viscoelastic properties of a clot in a time dependent manner
- Both devices allow to determine
 - the time to **onset of clot** formation
 - the **kinetics of clot** formation
 - the **firmness of a clot** and
 - eventual **clot lysis**

Bedside assays

- Alterations of haemostasis require global assessment of coagulation, such as thrombin generation assays, and also whole blood testing, such as thrombo-elastography (TEG) and rotational thromboelastometry (ROTEM)
- These POCT devices offer a **rapid diagnostic bedside test (10-30 min)** to aid the clinician in directing therapeutic interventions

TEG

Normal Hemostasis



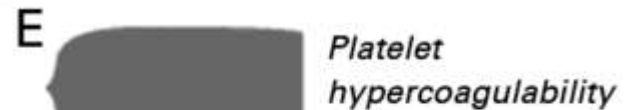
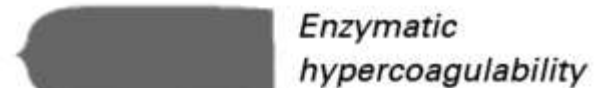
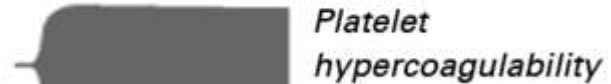
Normal Hemostasis



Hemorrhagic



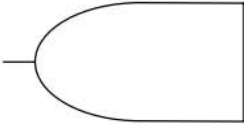

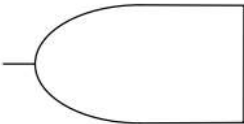









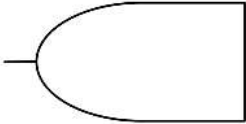

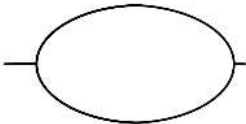
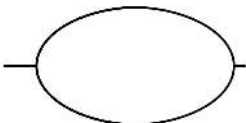
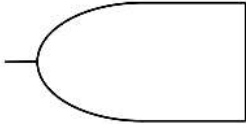

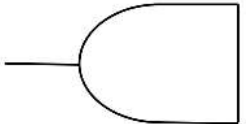
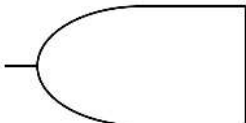
Thrombotic



Fibrinolytic



TEM

	Aptem	Fibtem	Intem	Extm
Normal findings				
Decreased fibrinogen concentration				
Decreased platelet count				
Hyper-fibrinolysis				
Heparin				

Does intraop-
coagulation/hemostasis monitoring
plays some role in making liver
transplant a great success

Conventional assays

Although often used as **standard coagulation tests (INR, aPTT, fibrinogen values, platelet count)** there are **no data** to suggest that on the results of these, the risk of bleeding can be predicted or hemostasis therapy can be guided by these assays

Bedside assays - TEG

Transplant Proc. 2010 Sep;42(7):2590-3. doi: 10.1016/j.transproceed.2010.05.144.

Thromboelastography-guided transfusion decreases intraoperative blood transfusion during orthotopic liver transplantation: randomized clinical trial.

Wang SC¹, Shieh JF, Chang KY, Chu YC, Liu CS, Loong CC, Chan KH, Mandell S, Tsou MY.

Author information

Abstract

OBJECTIVE: To test in a prospective randomized study the hypothesis that use of thromboelastography (TEG) decreases blood transfusion during major surgery.

MATERIAL AND METHODS: Twenty-eight patients undergoing orthotopic liver transplantation were recruited over 2 years. Patients were randomized into 2 groups: those monitored during surgery using point-of-care TEG analysis, and those monitored using standard laboratory measures of blood coagulation. Specific trigger points for transfusion were established in each group.

RESULTS: In patients monitored via TEG, significantly less fresh-frozen plasma was used (mean [SD], 12.8 [7.0] units vs 21.5 [12.7] units). There was a trend toward less blood loss in the TEG-monitored patients; however, the difference was not significant. There were no differences in total fluid administration and 3-year survival.

CONCLUSION: Thromboelastography-guided transfusion decreases transfusion of fresh- frozen plasma in patients undergoing orthotopic liver transplantation, but does not affect 3-year survival.

Bedside assays - TEM

FULL-TEXT ARTICLE

Transplant Proc. 2013;45(10):3637-9. doi: 10.1016/j.transproceed.2013.11.008.

Is "intra-operating room" thromboelastometry useful in liver transplantation? A case-control study in 303 patients.

Alamo JM¹, León A, Mellado P, Bernal C, Marín LM, Cepeda C, Suárez G, Serrano J, Padillo J, Gómez MÁ.

Author information

Abstract

Coagulation monitoring during liver transplantation (LT) is, even today, fundamental to reduce blood loss during surgery. Thromboelastometry (TEM) is a proven technique for controlling the various parameters that influence coagulation. However, there are no studies linking "intra-operating room" TEM (orTEM) with LT outcomes. We describe a case-control study in 303 liver graft recipients analyzing variables associated with operative complications and long-term LT outcomes. The results showed that orTEM reduced the use of blood products in patients with Model for End-Stage Liver Disease scores of ≥ 21 , retransplantation, and high surgical difficulty and important intraoperative bleeding. In addition, results in survival and postoperative complications were better when orTEM was used. In conclusion, we confirm that use of orTEM is associated with less use of blood products and a lower rate of complications after LT.

What imp. Role blood bank plays in ABOiLTx

- Blood grouping and antibody screening
- Titer of isoagglutinins
- Desensitization
- Arranging blood and blood products
- Communication to clinical staff regarding complexities of blood components and their acceptable blood group
- Record

ABOiLTx - Incompatibility

Similar to Red Cells Compatibility

SOT Recipient Group	SOT Donor Blood Group			
	O	A	B	AB
O	C	IC	IC	IC
A	C	C	IC	IC
B	C	IC	C	IC
AB	C	C	C	C

C= Compatible IC= Incompatible

Titer ?

Recipient	Donor	Testing Performed (IgM and IgG)
O	AB	Anti-A and Anti-B
O	B	Anti-B
O	A	Anti-A
B	AB	Anti-A
B	A	Anti-A
A	AB	Anti-B
A	B	Anti-B

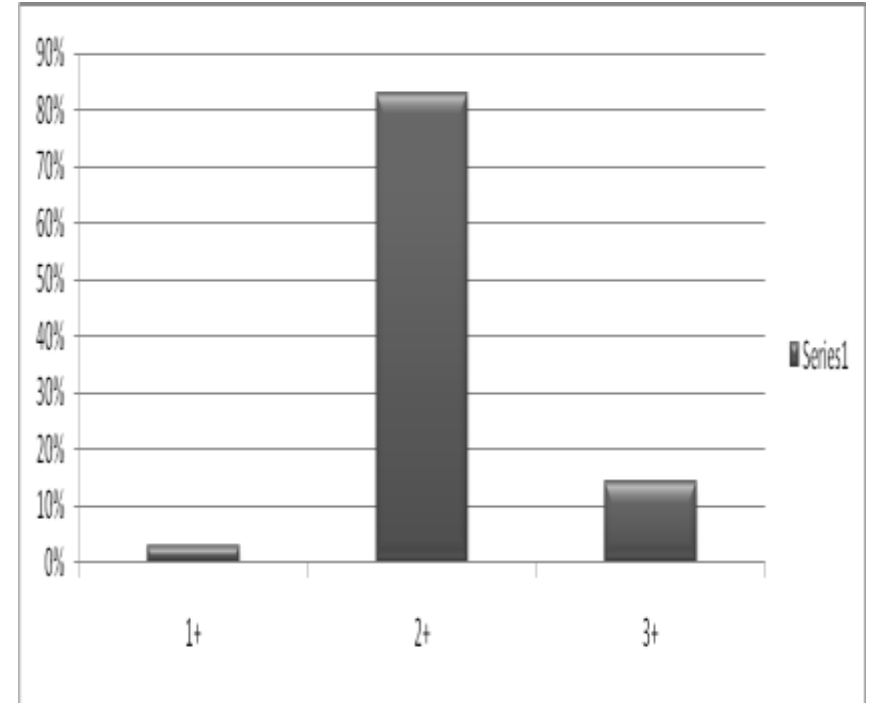
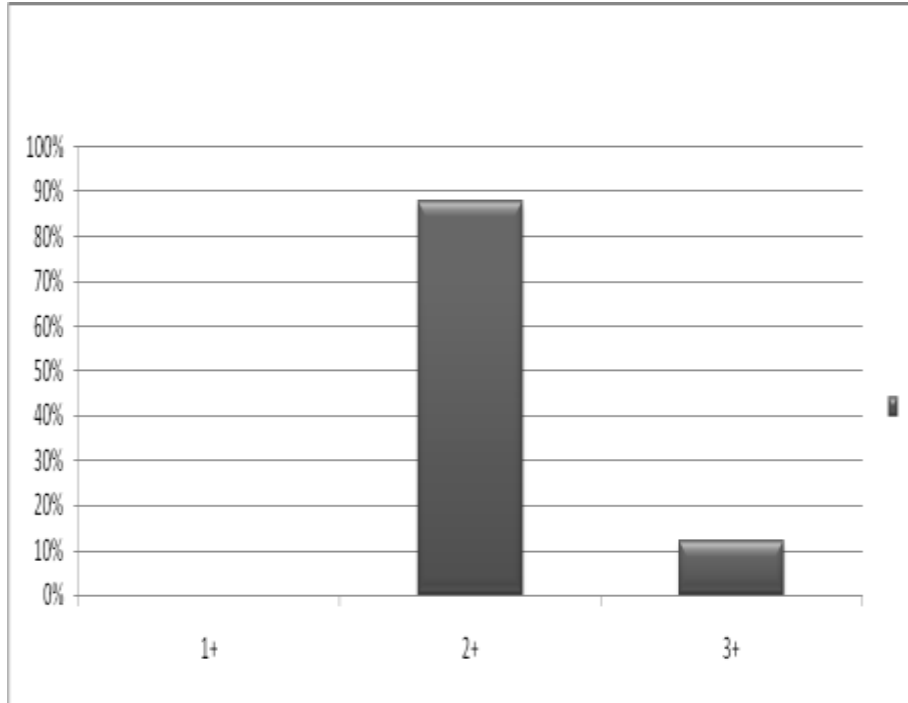
Recommended blood components type for ABOiSOT

Recipient	Donor	pRBC	FFP First Choice	FFP Second Choice	Platelets** First Choice	Platelets** Second Choice
O	A	O	AB	A	A	AB
O	B	O	AB	B	B	AB
O	AB	O	AB	A	AB	A
A	B	A or O	AB	A	AB	B
A	AB	A or O	AB	A	AB	A
B	A	B or O	AB	B	AB	A
B	AB	B or O	AB	B	AB	B

Dilemma of reporting titers in ABOiLTx

- CTT- standard and preferred methodology
- CAT(OCD), SPRCA(IMMUCOR), GCT(BIORAD)?

Standardization of column agglutination (CAT) and solid phase red cell adherence (SPRCA) techniques against the conventional tube technique (CTT) for titration of naturally occurring antibodies (anti-A, anti-B) in group O healthy blood donors (N=570)



%age coherence of SPRCA IgG(anti A + anti B) considering 2+ reaction as end titer result

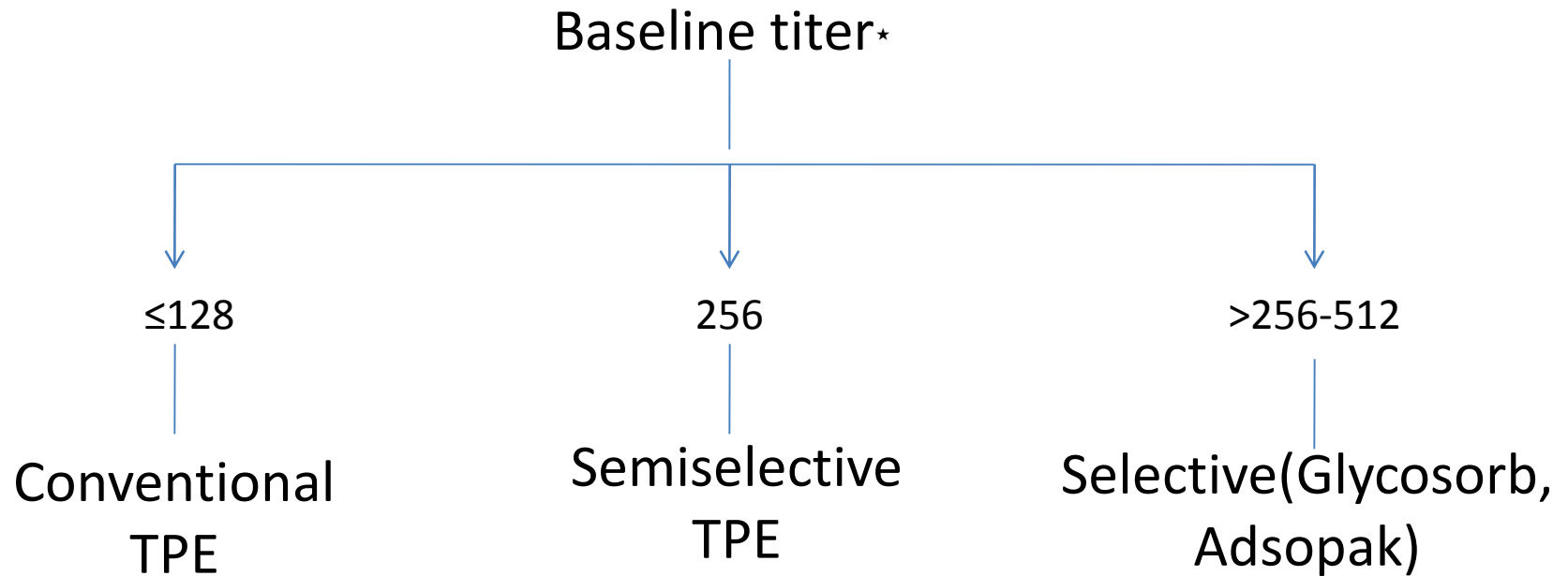
%age coherence of CAT IgG (anti A + anti B) considering 2+ reaction as end titer result

Considering **1+ reaction as the endpoint titer** we could observe a poor coherence of CAT and SPRCA against CTT for both antiA and anti B IgG antibodies (**CAT= 1%, SPRCA=10%,**). But when we chose 2+ reaction as the titer end point reaction in CAT and SPRCA (against the 1+ reaction strength in CTT) the coherence improved significantly for IgG (antiA+anti B).

What desensitization method we should choose: your Institute policy?

- Conventional plasma exchange,
- plasma exchange using semiselective filter(Evaflux)
- plasma exchange using selective filter(Glucosorb, Adsopak)

Desensitization Protocol-Institute policy



★=immediately before procedure and after Rituximab (Anti CD 20)

IMP:

- ❖ Acceptable end point titer(Kidney=8, Liver=16)
- ❖ informed consent, explanation about rebound phenomenon and financial counseling