

ROTEM DECISION SUPPORT

User Manual — v2.6

Tarek Tantawy, MD · WhiteCodeMed.ai

This tool interprets ROTEM results using a sequential 5-step algorithm derived from the Prince Sultan Cardiac Center (Riyadh, KSA) ROTEM peri-cardiac surgery coagulation management pathway, with a hyperfibrinolysis pre-step and protamine-overdose differentiation. It computes weight-based product doses, draws faithful TEMogram tracings, generates a SOAP-style EMR note, and stores encrypted patient records on the device. **Educational use only — final clinical decisions and responsibility rest with the treating physician.**

1. What's in this version

- **Sequential 5-step ROTEM algorithm with a hyperfibrinolysis pre-step** and a Step 05 differentiator between intrinsic factor deficiency and protamine overdose.
- **Weight-based product dosing** — calculates total mg / mL automatically. Weight is optional; without it the tool runs in interpretation mode and shows per-kg rates only.
- **Computed TEMogram tracings** for every evaluation, drawn from entered CT / A5 / ML, with a faint green normal-range band behind each trace so abnormalities are visually obvious. Layout: **FIBTEM and EXTEM on the top row**, INTEM and HEPTTEM beneath, APTTEM appended when run.
- **Measured-amplitude inputs (optional)** — enter the real MCF (or A10) and per-assay amplitudes and the tracing becomes measured rather than extrapolated.
- **Patient identifiers anchored at the top of the app** — always visible while you work, masked automatically when records are locked.
- **Saudi four-part name standard** — First, Father's, Grandfather's, and Family name in line with MOH / SCFHS documentation, with Arabic field labels. National ID / Iqama field for cross-referencing with the national identifier.
- **Indication picker** — common ROTEM indications including ECMO anticoagulation; "Other" reveals a free-text field.
- **Sample-time field** — auto-prefills to now; edit to reflect when the sample was actually drawn.
- **Auto-generated SOAP note** — patient identifiers, sample time, indication, ROTEM values, assessment, and plan all stamped into the header; editable in-page; one-tap copy to clipboard.
- **Encrypted patient records** — full demographics; one patient holds many timestamped notes. AES-256-GCM with a PBKDF2-derived key from your passcode. The passcode is never stored. When locked, all PHI on screen is masked (values preserved, displayed as dots).
- **Encrypted backup export / import** — the backup file contains no readable PHI and can only be restored with the same passcode that created it.
- **Clinical-instrumentation UI** — cool palette, Inter + IBM Plex Mono typography, tabular numerals, compact panel headers. Designed to feel like an EMR/monitor surface rather than a generic web form.

- **Adult and paediatric pathways** — the Population selector switches every threshold and dose between the adult pathway and the Paediatric Cardiac A5 Algorithm, and re-runs the evaluation immediately. See section 11.
- **Scan ROTEM** — read values straight off a photo or screenshot of the ROTEM Sigma display, including patient name and MRN, with every value shown for review before it is applied. See section 12.

2. How the app is laid out

The app is two screens. The first collects the patient; the second runs the algorithm chosen for that patient. You cannot reach the algorithm without passing through the patient screen, which is deliberate — the age group, and therefore every threshold and dose, comes from what you enter there.

- **Screen 1 — Patient.** Four-part name, MRN, National ID, date of birth, gestational age at birth (shown for infants), and weight. Underneath, an Algorithm panel names the pathway that will be used, explains why in plain terms, lists its main thresholds and cites its source. Press Continue to the algorithm.
- **Screen 2 — Algorithm.** A bar across the top states the pathway in use together with the patient, their age and weight, so the algorithm is named on screen at all times rather than inferred. Below it sit the ROTEM inputs, the recommendations, the saved records and the EMR note. A Patient details button returns to screen 1 at any point.

3. Quick start (60 seconds)

1. Open the file at an `https://` or `http://localhost` address (not by double-clicking — see Deployment Guide). The version **v2.6** should appear at the top right.
2. At the top, enter the **patient identifiers**: First name, Father's name, Grandfather's name, Family name, MRN, National ID / Iqama (optional), and Date of birth.
3. In the Inputs panel, enter **weight** (optional — unlocks total doses), **sample time**, **indication**, and the ROTEM values you have.
4. Press **Evaluate**. You'll see the tracings (FIBTEM/EXTEM on top, INTEM/HEPTEM below), the step-by-step interpretation, and the auto-filled EMR note with the patient header included.
5. To save: scroll to the **Patient record** section, set a passcode the first time, then press **Save current note to record**. Use **Lock** before stepping away — the patient strip will mask to dots until you re-enter the passcode.

4. Inputs explained

3.1 Patient identifiers (top strip)

A persistent strip at the top of the app holds the identifiers — visible while you work on every section. Follows the **Saudi four-part name standard** used by MOH, SCFHS, and major hospital systems:

Field	Notes
First name (الاسم الأول)	Given name.
Father's name (اسم الأب)	Father's given name.
Grandfather's name (اسم الجَد)	Paternal grandfather's name.
Family name (اسم العائلة)	Family or tribal name (e.g. Al-...).
MRN	Medical record number. Records are keyed by MRN, so re-entering the same MRN appends notes to that patient's timeline.
National ID / Iqama	Optional 10-digit national identifier. Useful for cross-referencing with the hospital information system.
Date of birth	Used in the note header.
Clear	Clears the identifiers (does not affect saved records).

When records are locked, all identifier fields are **masked to dots** automatically (values preserved in the DOM, hidden from view). The fields reappear instantly on unlock — the same pattern Epic and other EMRs use for screen locking.

3.2 Clinical inputs (Patient section in Inputs panel)

Field	Purpose
Weight	Optional. When present, every per-kg dose is also computed as a total. Blank → interpretation mode (rates only).
Population	Adult / Pediatric — context only at present; does not change algorithm thresholds.
Sample time	Time the ROTEM sample was drawn. Auto-prefills to now; edit if you write the note later. Appears in the SOAP note header and is saved with the record.
Indication	Reason for the ROTEM. Choose from the list or pick Other for free text. Captured in the note's Subjective section.

3.3 ROTEM parameters

Enter only the values you have — the algorithm evaluates only the steps with sufficient data and shows which inputs are needed for the others.

Parameter	Used for	Algorithm criterion
INTEM CT	Heparin (with HEPTTEM); intrinsic CT	ratio ≥ 1.25 → protamine
HEPTTEM CT	Heparin (paired with INTEM)	both >240 s and ratio <1.25 → Step 05
EXTEM CT	Extrinsic factor deficiency	> 80 s with FIBTEM A5 > 9
EXTEM A5	Clot amplitude (firmness)	< 30 mm with FIBTEM A5 cutoff drives

Parameter	Used for	Algorithm criterion
		Steps 02/03
EXTEM ML	Fibrinolysis (60 min lysis %)	> 15% → hyperfibrinolysis pre-step
FIBTEM A5	Fibrinogen contribution	< 9 mm with low EXTEM A5 → fibrinogen / cryo
APTEM A5	Confirms hyperfibrinolysis	A5 – EXTEM A5 ≥ 10 mm → pre-step

3.4 Measured amplitudes (optional, advanced)

Click **show** next to “Measured amplitudes” to reveal four optional fields:

- **EXTEM MCF** and **FIBTEM MCF** — when entered, the trace uses the measured maximum clot firmness directly. The label changes from MCF~ (estimated) to MCF (measured), and the tracings panel header notes that measured values are in use.
- **INTEM A5** and **HEPTEM A5** — true per-assay amplitudes. Without them, the trace approximates using EXTEM A5 as a proxy.

Leave any of these blank to keep the A5-based extrapolation. The algorithm itself does not depend on these fields — they only refine the visual tracings.

5. Reading the tracings

Each TEMogram is drawn from the values you entered, with the classic ROTEM shape: a pink CT nub at the start, a sigmoid rise after CT, the clot reaching peak firmness (measured MCF or estimated from A5), and an optional lysis taper when EXTEM ML is given. Behind every trace is a faint **green normal-range band** showing where a normal clot of that assay would sit.

Layout: **FIBTEM is top-left, EXTEM top-right** (the fibrinogen / extrinsic pair that drives Steps 02–04). **INTEM is bottom-left, HEPTEM bottom-right** (the intrinsic / heparin pair, scanned together for Step 01 and the Step 05 differential). APTEM, when run, appears after.

4.1 Pattern recognition at a glance

Pattern	What you'll see
Normal	All traces sit inside their green bands.
Residual heparin	INTEM nub is delayed (long CT); HEPTEM CT is normal — divergent CTs are the tell.
Hypofibrinogenemia	FIBTEM trace is a thin sliver well below its band; EXTEM body is narrower than its band.
Platelet deficit	EXTEM/INTEM bodies are narrow below their bands; FIBTEM looks normal — the missing width is platelets.
Extrinsic factor deficiency	EXTEM CT is delayed past its band; amplitudes can still be normal.
Intrinsic factor deficiency	Both INTEM and HEPTEM CTs are delayed; amplitudes are reduced.

Pattern	What you'll see
Protamine overdose	Both INTEM and HEPTTEM CTs are delayed, but amplitudes are inside their bands — the giveaway.
Hyperfibrinolysis	EXTEM (and INTEM) trace tapers back down after the peak; APTTEM, if run, does not.

Reference ranges used (ROTEM Sigma adult values): EXTEM CT 38–79 s, MCF 50–72 mm; INTEM/HEPTTEM CT 100–240 s, MCF 50–72 mm; FIBTEM CT 38–62 s, MCF 9–25 mm. If your laboratory uses different local reference ranges, tell the developer and they can be updated to match your institution.

6. The 5-step algorithm

The step structure below is shared by both pathways, but every threshold and dose shown in it is the ADULT value. On the paediatric pathway the cut-offs and doses differ throughout, and two extra branches apply — see section 11 for the full comparison. The banner above the results always names the pathway that produced them.

Pre-step — Hyperfibrinolysis. Fires when EXTEM ML > 15% or APTTEM A5 – EXTEM A5 ≥ 10 mm with low EXTEM A5. Recommends tranexamic acid 25–50 mg/kg. **Correct hyperfibrinolysis BEFORE further product transfusion — products given into a lysing clot are wasted.**

Step	Trigger criterion	Recommendation
01 Protamine	INTEM CT / HEPTTEM CT ≥ 1.25	Protamine 0.3–0.5 mg/kg; then re-check ROTEM. Do not exceed 1:1 of initial heparin bolus.
02 Fibrinogen	EXTEM A5 < 30 AND FIBTEM A5 < 9	Fibrinogen or cryoprecipitate to target FIBTEM A5 ≥ 12 mm (dose calculated automatically).
03 Platelets	EXTEM A5 < 30 AND FIBTEM A5 > 9	Platelets 10–15 mL/kg.
04 FFP / PCC	EXTEM CT > 80 AND FIBTEM A5 > 9	FFP 10–15 mL/kg, or PCC 20–25 IU/kg per institutional protocol.
05 Intrinsic	Both INTEM & HEPTTEM CT > 240 s AND ratio < 1.25	Differentiated by amplitudes — see callout below.

Step 05 differentiator. Same INTEM+HEPTTEM prolongation pattern, opposite intervention:

- **EXTEM A5 < 30 (low amplitudes)** → intrinsic factor deficiency (VIII, IX, XI, XII). Give FFP 10–15 mL/kg. PCC will NOT replace VIII or XI.
- **EXTEM A5 ≥ 30 (amplitudes preserved)** → protamine overdose. **Do NOT give more protamine.** Re-check ROTEM in 10 min; audit total protamine vs. heparin bolus.

If every step is negative and bleeding continues with a normal ROTEM, the tool prompts for **surgical re-evaluation** and the usual checks: surgical source, hypothermia, hypocalcemia, anemia, acidosis.

7. The EMR note

Each evaluation auto-fills a SOAP-style note. The note is fully editable in-page — adjust the wording, add the clinician signature, then **Copy to clipboard** and paste it into the hospital EMR. The note pulls in:

- **Patient identifiers from the top strip** — the full four-part name, MRN, National ID / Iqama, and DOB. Lines appear only for fields that were filled.
- Sample-drawn time and indication
- Weight (or a note that doses are per-kg only)
- All entered ROTEM values, formatted compactly
- Each indicated step as an Assessment line + the corresponding Plan line with the per-kg rate and the computed total dose
- Standard reminders: re-check ROTEM after intervention; consider surgical source if bleeding persists
- The disclaimer line baked in: final decision rests with the treating physician

Example header:

```
ROTEM-GUIDED COAGULATION ASSESSMENT
Sample drawn: 2026-06-03 13:42
- Patient: Mohammed Abdullah Ahmed Al-Saud
- MRN: 1234567
- National ID / Iqama: 1012345678
- DOB: 1970-05-15
```

```
SUBJECTIVE / INDICATION:
- Indication: Post-CPB bleeding
- Weight: 70 kg
```

8. Patient records

PHI / data-governance notice. This stores identifiable patient data in *this browser on this device only*. Records are encrypted at rest (AES-256-GCM with your passcode). It is **not** a certified medical record and must not be the system of record. Use only on a secure, authorized device. **If you forget the passcode, the data cannot be recovered.**

Patient identifiers are entered at the **top of the app** (Section 3.1). The Patient record section, near the bottom of the page, contains the passcode lock, the Save button, the records list, and the encrypted backup controls.

7.1 First-time setup

6. In the Patient record section, you'll see a lock banner asking you to **create a passcode** (minimum 6 characters). This passcode derives the AES-256 encryption key via PBKDF2.
7. The passcode itself is never stored — only a random salt and a verification token are kept.
8. Records are unlocked automatically after you set the passcode. On a fresh load, you'll see the lock banner; enter the passcode to view records.

7.2 Saving a note

9. Fill the **patient identifiers at the top** (Saudi four-part name, MRN, optionally National ID and DOB).
10. Generate a note via Evaluate.
11. Scroll to Patient record. Press **Save current note to record**. The full name, MRN, National ID, DOB, and note are encrypted before going to storage. Records are keyed by MRN so re-entering the same MRN appends to that patient's timeline.
12. Use the top-strip **Clear** button, or **New / clear patient** in the records section, before starting a different patient.

7.3 PHI masking (screen lock)

When the records are locked, the patient strip at the top automatically masks: name fields, MRN, and National ID display as dots; the Clear button is hidden; the panel header gains a small  **hidden while locked** indicator. The values remain in the page so they reappear instantly on unlock — the same UX Epic and similar EMRs use for screen-lock masking. First-time setup (before any passcode is set) is NOT masked, so you can enter identifiers normally to register the passcode.

7.4 The records list

- Each patient is a collapsible card showing the note count. Click the header to expand and view every saved note.
- Each note shows the sample time, full text, and per-note **Copy** and **Delete** buttons.
- **Delete patient** removes the patient and all their notes (with confirmation).
- Search by name or MRN with the search box.
- **Lock** clears the encryption key from memory, hides the records list, and masks the top patient strip. Re-enter the passcode to unlock.

7.5 Backups (export / import)

- **Export backup** downloads an encrypted .json file. It contains no readable patient data and can only be restored with the same passcode that created it.
- **Import backup** restores those encrypted records. Importing keeps your current passcode; the imported records open with the backup's original passcode.
- Because browser storage can be cleared by the user, IT, or browser updates, treat regular exports as your *only* safety net.

9. Workflow examples

8.1 Bedside interpretation (no save)

13. Skip weight; enter the ROTEM values you have.
14. Press Evaluate. Read the tracings and recommendations.
15. Note shows per-kg rates and an amber “Interpretation mode” banner.

8.2 Full case with save

16. Enter weight, sample time, and indication.
17. Enter all available ROTEM values; expand “Measured amplitudes” if you have MCF.
18. Evaluate → review tracings + recommendations + EMR note.
19. Open Patient record, ensure unlocked, enter demographics, Save.
20. Copy the note from the textarea, paste into the hospital EMR.

8.3 Serial ROTEMs on the same patient

21. After the first save, the patient is in the records list.
22. For each subsequent ROTEM: clear/update the ROTEM values, re-enter the new sample time, Evaluate.
23. With the same MRN already entered, press Save — the new note appends to that patient's timeline.
24. Expand the patient card to see the full chronological series.

10. Troubleshooting

Symptom	Cause & fix
Banner: “Encryption is unavailable”	Opened as file:// — open via https or http://localhost (see Deployment Guide).
Red banner: “Patient weight is required”	You're trying to evaluate without entering weight. Either fill weight, or leave at least one ROTEM parameter — the tool runs in interpretation mode without weight.
“Insufficient data” card after Evaluate	No step's criteria could be tested with what's entered. The card lists the minimum dataset for each decision.
“Saved ✓” doesn't appear	Either no note text in the textarea, or no name/MRN entered. Both are required.
Records gone after browser update	Browser storage was wiped. Import your most recent encrypted backup.
Forgot passcode	Records are unrecoverable by design. Restore from a backup whose passcode you know, or start fresh.
Patient name shows as dots	Records are locked. Scroll to the Patient record section and enter your passcode — the strip

Symptom	Cause & fix
	unmasks instantly.
Wrong tracing shape vs. real machine	Verify the values you entered. If you have measured MCF, enter it under “Measured amplitudes” for an exact curve.

11. Limitations and responsible use

- **Educational tool, not a certified medical record.** Transcribe final notes into the hospital EMR.
- The algorithm reproduces the Prince Sultan Cardiac Center (Riyadh, KSA) ROTEM pathway but cannot account for every clinical context. Hemodynamics, ACT, Hb, temperature, and the surgical field always take priority.
- Tracings are computed (and partly extrapolated when MCF is not entered). They are visually faithful to the ROTEM machine output but are not a substitute for the machine itself.
- Reference ranges are ROTEM Sigma adult typical values. Local reference ranges may differ — request a customised build if needed.
- Encryption protects data at rest on the device. It does not replace your institution's data-protection and access-control policies.
- Final clinical decisions and responsibility rest with the treating physician — typically the intensivist or anesthesiologist managing the case.

12. Adult, paediatric and neonatal pathways

The Population selector decides which algorithm runs, and it is set for you from the date of birth. It is not a label: the pathway swaps every threshold and dose, shows or hides the paediatric-only inputs, and re-runs the evaluation on the spot. A coloured banner above the recommendations names the active pathway, so a printed or pasted result always records which algorithm produced it. See 11.1 for how the group is chosen.

- **Adult** — PSCC / Görlinger adult peri-cardiac surgery pathway.
- **Paediatric** — evidence-based thromboelastometry (ROTEM)-guided bleeding management algorithm for paediatric cardiac surgery, Figure 1 of Görlinger K, Kammerer T. Value of point-of-care algorithms in pediatric cardiac surgery. J Card Crit Care TSS. 2024;8:181–184 (doi:10.25259/JCCC_43_2024). Algorithm courtesy of Klaus Görlinger, Essen, Germany.
- **Neonate** — the same algorithm and the same thresholds as Paediatric, with one added rule: the severity-graded platelet band may not be estimated from A5, so a measured EXTEM A10 is required before a graded dose is given. See 11.5.

12.1 How the age group is chosen

Enter the date of birth in the patient strip and the pathway is selected automatically. A line under the selector shows what was derived, for example “Age 9 days → Neonate (from DOB)”.

- **Neonate** — 28 days old or less.

- **Paediatric** — 29 days up to the 18th birthday.
- **Adult** — 18 years and over.

You can still change the selector by hand, and your choice is kept — the tool does not overwrite it. But a deliberate override is never silent: the line under the selector turns red and reads “DOB gives 9 days → Neonate, overridden to Adult”, and a red banner appears at the top of the recommendations repeating the mismatch and naming the pathway that actually produced them. Entering a new date of birth re-establishes the derived group.

Corrected age is used, not chronological age. When a date of birth puts the patient under two years old, a Gestational age at birth field appears. Enter it for a preterm baby and the age is corrected to a 40-week term equivalent before the group is decided, so a 45-day-old born at 28+3 weeks is still handled as a neonate rather than falling into the paediatric group on the calendar alone. The Algorithm panel spells the arithmetic out — “Born at 28+3 weeks · chronological age 1 month · corrected age 36 days before term equivalent · postmenstrual 34+6 weeks”. Leave the field blank for a term birth and chronological age is used unchanged.

Weight is a cross-check, never the decider. Body weight cannot tell a small adult from a large child, so it never selects a pathway on its own. It is used to flag a gross mismatch — a 3 kg patient on the adult pathway, or a 70 kg patient on the neonatal one — and, when no date of birth has been entered, a weight under 15 kg on the adult pathway prompts you to check the setting.

A date of birth in the future is ignored rather than acted on. Reset keeps the date of birth, so serial ROTEMs on the same patient stay on the right pathway; New / clear patient clears it.

12.2 Thresholds and doses side by side

Parameter	Adult	Paediatric
EXTEM A5 — low clot amplitude	< 30 mm	< 25 mm
FIBTEM A5 — fibrinogen deficit	< 9 mm	< 7 mm
Fibrinogen substitution target	FIBTEM A5 ≥ 12 mm	FIBTEM A5 ≥ 10 mm
EXTEM CT — extrinsic factor deficit	> 80 s	> 90 s
INTEM & HEPTTEM CT — intrinsic / protamine	> 240 s	> 280 s
Tranexamic acid	25–50 mg/kg	15 mg/kg single bolus
Platelet concentrate	10–15 mL/kg	5–10 mL/kg
PCC	20–25 IU/kg	10–15 IU/kg
FFP	10–15 mL/kg	10–15 mL/kg

Parameter	Adult	Paediatric
Protamine	0.3–0.5 mg/kg	0.3–0.5 mg/kg

12.3 Differences beyond the numbers

- **Hyperfibrinolysis (pre-step).** Adult fires on EXTEM ML > 15%, or an APTEM – EXTEM A5 difference ≥ 10 mm alongside a low EXTEM A5. Paediatric requires BOTH EXTEM A5 < 25 mm AND EXTEM ML $\geq 15\%$. Because both limbs are mandatory there, a missing value is reported as “not assessed” rather than as a negative result.
- **Protamine (Step 01).** The paediatric pathway additionally asks for ACT after protamine to be clearly above baseline. Enter both ACT values and both limbs must hold; leave them blank and the step fires on the CT ratio alone and says plainly that the ACT limb was not checked. If ACT has already returned to baseline, the step declines rather than recommending more protamine.
- **Platelets (Step 03).** Paediatric adds platelet aggregometry: ADPTEM ≤ 35 and/or TRAPTEM ≤ 45 Ω ·min triggers the platelet step on its own, even when amplitudes do not meet the transfusion trigger. The paediatric dose is also severity-graded — see 11.5.
- **Check-and-correct card.** The paediatric pathway opens with a standing reminder to check core temperature < 36 °C, pH < 7.3, base excess < –6 mmol/L, lactate > 2 mmol/L and ionised calcium < 1 mmol/L. The tool does not measure or check any of these — verify them yourself, and correct them in parallel with transfusion rather than after it.
- **Dose reference table.** The fibrinogen / cryoprecipitate table at the foot of the page is built on the adult target of FIBTEM A5 ≥ 12 mm, so it is hidden on the paediatric pathway to stop it being read as applying there.

12.4 Paediatric adjunct inputs

These four fields appear only when Population is set to Pediatric, and all are optional. They feed the two paediatric-only branches described above.

Field	Purpose
ADPTEM (Ω ·min)	Platelet aggregometry, ADP pathway. ≤ 35 triggers the platelet step on its own.
TRAPTEM (Ω ·min)	Platelet aggregometry, TRAP pathway. ≤ 45 triggers the platelet step on its own.
ACT baseline (s)	Pre-heparin ACT, for the Step 01 protamine comparison.
ACT after protamine (s)	Post-reversal ACT. Must be clearly above baseline for Step 01 to fire when both ACT values are entered.

Known limitation: the fibrinogen and cryoprecipitate dose calculation uses the same per-kilogram relationship on both pathways, with only the target changed (≥ 10 mm instead of ≥ 12 mm). The paediatric chart specifies a target but not a dosing formula, so if your unit uses a different paediatric calculation, treat the computed dose as indicative and apply your own.

12.5 Severity-graded platelet dosing (paediatric)

On the paediatric pathway the platelet dose is graded by how low the clot amplitude is, rather than given as one band. The grading is taken from Naguib et al. 2023, a single-centre protocol for neonatal and infant cardiac surgery:

- **EXTEM A10 30–40 mm** — 20 mL/kg (mild deficit).
- **EXTEM A10 20–30 mm** — 30 mL/kg (moderate deficit).
- **EXTEM A10 below 20 mm** — 40 mL/kg (severe deficit).

Those bands are defined on A10, while the rest of this tool runs on A5. If you enter a measured EXTEM A10 in the paediatric adjuncts, the band is applied exactly as published and the card says so. If you do not, the band is estimated by offsetting A5 upward — EXTEM A10 runs roughly 8–10 mm above A5 on the ROTEM Sigma — and the card states plainly that the band was estimated. Enter the measured A10 whenever you have it.

Read the dose before you give it. These graded doses are four to eight times the 5–10 mL/kg band in the Görlinger paediatric algorithm. That is a real difference between two published protocols, not a rounding error: Naguib's population is specifically neonates and infants undergoing arterial switch, arch augmentation and Norwood procedures, where dilutional thrombocytopenia on a small circuit prime is severe. The card therefore shows the Görlinger band alongside the graded dose so the two are visible together, and the computed volume should always be checked against the patient's size and fluid tolerance.

Neonates: the A5 estimate is not accepted. On the Neonate setting the graded band is only applied against a measured EXTEM A10. If no A10 has been entered, the platelet step still fires and still says platelets are indicated, but it gives no graded dose at all — it states that a measured A10 is required, shows the band table so you know what you are working towards, and falls back to the conservative Görlinger 5–10 mL/kg band in the meantime. The reason is proportion: the A5 → A10 offset is taken from older patients, the bands differ by 10 mL/kg each, and in a 3 kg neonate choosing the wrong band is the difference between 60 mL and 120 mL of platelets. Either give the conservative band or obtain the A10 and re-evaluate.

Severity grading needs an amplitude to grade on. When the platelet step is triggered by aggregometry alone, with amplitudes above the trigger, the standard 5–10 mL/kg band is shown instead and the card explains why.

12.6 Abnormal values in red

ROTEM values are shown in red, in the input box and in the results summary, when either of two things is true: the value crosses a decision threshold of the pathway in use, or it lies outside the reference interval printed by the analyser. Hovering a red field says which of the two applies.

Both tests are needed. A FIBTEM A5 of 5 mm sits inside the analyser's adult reference range yet is below the 7 mm paediatric fibrinogen trigger, so on the paediatric pathway it fires a step; without the threshold test it would have appeared unremarkable. Conversely an INTEM CT of 120 s is below the reference floor but nowhere near the intrinsic threshold, and is flagged on reference grounds alone. Because the first test is pathway-dependent, the same number can be red on one pathway and not on another — FIBTEM A5 of 8 mm is flagged for an adult (below 9) and not for a child (at or above 7).

One caveat worth holding on to: the reference intervals are the adult intervals the analyser itself prints and shades pink, and they are applied whatever the patient's age. Paediatric and

neonatal reference ranges genuinely differ. On those pathways read a red value driven by the reference test as “differs from the adult reference”, not as a paediatric abnormality; the threshold-driven reds are population-correct.

13. Scanning a ROTEM screen

The Scan ROTEM button next to Evaluate reads values directly off an image of the ROTEM Sigma display, so a full result set can be entered without typing. It accepts a photo taken on the spot or an image already in the photo library, and it runs entirely on the device — no image and no patient data leaves the browser.

- **What it reads:** CT, A5, A10, MCF and ML for all four assays, plus the patient name and identifier from the panel headers. A Saudi four-part name is split across the four name fields automatically.
- **Nothing is applied until you confirm.** Every extracted value is shown in a review table first, with an em dash for anything that could not be read. Values that are applied are highlighted in yellow in the input fields; the highlight clears as soon as you touch the field, marking it as checked.
- **Gaps are named, not hidden.** If a value the algorithm depends on could not be read, an amber warning on the review screen says which steps that will block — for example that INTEM CT and HEPTTEM CT are both needed for the heparin ratio.
- **Accuracy.** A native screenshot from the machine's own Print Screenshot button reads essentially completely. A square-on, well-lit photograph of the screen reads most values. A photograph taken at an angle, in glare, or with the display only partly in frame reads considerably less, and will leave gaps to fill in by hand.
- **It needs a hosted address.** Scan requires JavaScript and a one-off download of the recognition engine, so it only works when the app is opened from an <https://> link. Opened directly from the Files app on iOS, the button will do nothing — see the Deployment Guide.

Treat scanning the way you would treat dictation into a chart: faster than typing, and wrong often enough that the read-back matters. Check the review table against the screen before applying, every time.

14. References

The algorithms implemented by this tool derive from the following sources. The paediatric pathway is taken from the first reference; the adult pathway from the institutional protocol and the remaining references.

- **Görlinger K, Kammerer T.** Value of point-of-care algorithms in pediatric cardiac surgery. *J Card Crit Care TSS*. 2024;8:181–184. doi:10.25259/JCCC_43_2024. — Source of the paediatric pathway (Figure 1).
- **Naguib AN, Carrillo SA, Corridore M, et al.** A ROTEM-guided algorithm aimed to reduce blood product utilization during neonatal and infant cardiac surgery. *J Extra Corpor Technol*. 2023;55(2):60–69. doi:10.1051/ject/2023017. — Source of the severity-graded platelet dosing (Figure 3).
- **Prince Sultan Cardiac Center, Riyadh, KSA.** ROTEM peri-cardiac surgery coagulation management pathway. — Source of the adult pathway.

- **Görlinger K, Pérez-Ferrer A, Dirkmann D, et al.** The role of evidence-based algorithms for rotational thromboelastometry-guided bleeding management. *Korean J Anesthesiol.* 2019;72(4):297–322.
- **Machovec KA, Jooste EH.** Pediatric transfusion algorithms: coming to a cardiac operating room near you. *J Cardiothorac Vasc Anesth.* 2019;33:2017–2029.
- **Casselman FP, Lance MD, Ahmed A, et al.** 2024 EACTS/EACTAIC guidelines on patient blood management in adult cardiac surgery. *Eur J Cardiothorac Surg.* 2024;ezae352.

15. Licensing & contact

This Tool is distributed under the **Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)** license. In plain terms: you may share it with attribution, you may not use it commercially, and you may not redistribute modified versions. See the accompanying LICENSE document for full terms.

The accompanying **Terms of Use** document covers the educational scope, warranty disclaimers, limitation of liability, and patient-data responsibilities. Read both documents before deploying the Tool, and have your institutional legal team review them before any institutional adoption.

- **LICENSE** — CC BY-NC-ND 4.0 marking, attribution format, what counts as commercial, contact for permissions
- **Terms of Use** — clinical scope, no-medical-advice statement, permitted/prohibited uses, PHI responsibilities, governing law, IP, ROTEM™ trademark acknowledgement

Contact

- Tarek Tantawy, MD
- WhiteCodeMed.ai
- Email: info@WhiteCodeMed.ai

For requests outside the CC BY-NC-ND license (commercial use, modifications, translations, integrations), contact the author by email.

ROTEM Decision Support v2.6

Built by Tarek Tantawy, MD · WhiteCodeMed.ai

© 2026 Tarek Tantawy, MD · WhiteCodeMed · All rights reserved · CC BY-NC-ND 4.0