Aggregometer Thrombomate XRA
First Demo Installation in the Czech Republic

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Introduction

Laboratory testing has an important role in the diagnosis of inherited or acquired platelet disorders. Platelet counts (PLT) and Mean Platelet Volume (MPV) are obtained from complete blood count (CBC). The platelet function can be assessed by light transmittance aggregometry (LTA) or whole blood aggregometry (WBA). However, LTA is still a „Gold Standard" in platelet function testing.

AIM

- to compare the results of the Apact 4004 and Thrombomate XRA (TMXRA) of healthy donors and patients with platelet dysfunction.

Apact 4004   **Thrombomate XRA**

Material and Methods

- 33 samples were analyzed – 12 patients and 21 donors (10 men, 23 women) from 20 to 70 years old (7 patients with diagnosis D689, 1 with diagnosis D699, 2 with diagnosis D759, 1 with diagnosis M170, and 1 with diagnosis K921),
- venous blood was collected into Sarstedt tubes with 3.8% sodium citrate,
- Platelet-rich plasma (PRP) was obtained by centrifugation at 150 g for 12 minutes respectively
- Platelet-poor plasma (PPP) at 2500 g for 15 minutes.

	Reference range (%)		Agonist concentration	
	Apact 4004	Thrombomate XRA	Apact 4004	Thrombomate XRA
ADP (µmol/L)	55–95	> 65	5	5
COL (µg/mL)	55–95	> 70	2	2
EPI (µmol/L)	55–95	> 70	5	5
AA (mmol/L)	55–95	> 70	1.6	1
RISTO (mg/mL)	55–95	> 80	1.5	1.2

- LTA Kit of Thrombomate XRA:
- a graphic and statistical evaluation was performed using MedCalc 18.2.1 (Bland-Altman plot).

Results

- Statistical and graphical evaluation

	ADP Apact 4004	ADP TMXRA	COL Apact 4004	COL TMXRA	EPI Apact 4004	EPI TMXRA	AA Apact 4004	AA TMXRA	RISTO Apact 4004	RISTO TMXRA
Number of samples	16		29		7		30		8	
Mean	90	86	97	95	70	69	88	83	93	91
SD	7.8	9.8	7.1	9.7	29.2	37.7	16.7	18.2	3.2	10.3
CV (%)	8.7	11.4	7.3	10.3	42	54.3	19	21.9	3.4	11.3
Minimum	68	60	78	77	26	13	4	3	88	75
Maximum	102	98	111	121	91	98	100	108	96	100
% of samples in range ± 1.96 SD	100		96.6		100		96.7		100	

A descriptive statistics and Bland-Altman plots show that:
- Mean, SD, CV, MIN, MAX do not differ so much,
- all regression lines of differences detect proportional differences and no systematic differences were found,
- no outliers were detected,
- no statistically significant differences were found between the results (more than 95% of the data is in the interval mean ± 1.96 SD)

The different numbers of examinations were influenced by the requirements of the clinics and the stability of the agonists/KITS.
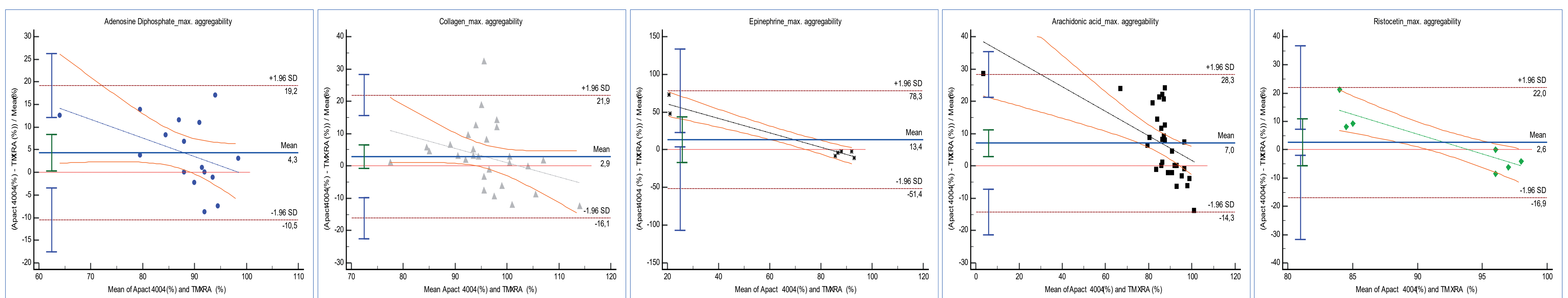
Conclusions

Platelet function testing is a routine laboratory method today. However, the results can be affected by many factors. One of them is the instrumentation used.

Our department had an opportunity to test the latest aggregometer on the market from November 2022 to February 2023. Thrombomate XRA (Benk Elektronik) is a fully automated system for light transmission aggregometry (LTA).

This device allows to:
- measure of ADP, COL, EPI, AA and RISTO (it is possible to choose from five different Kits with typical agonist concentrations or to compose own screening panels,
- issue all important parameters, i. e Lag. Phase, Shape change, Slope, Max. agg., AUC, Disaggregation,
- load two reagent racks and measure up to 5 samples simultaneously (25 tests/h),
- monitor the stability of Kits by individual QR codes.

The statistical and graphical evaluation shows a very good correlation of results among Apact 4004 (reference system) and Thrombomate XRA. The measurements of two agonists (AA and RISTO) could be affected even by a slight difference in their concentrations.

References

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