uncertainty as well as more and severe clinical complications. Therefore, it is suitable to use mathematical methods to analyse the uncertainty of PAF clinical data.

Objective To investigate the new analysis methods on PAF clinical data, to enrich PAF analysis methodology, and based on the ways to put forward new proposals for PAF management clinically.

Methods (1) Through the review of the literature, the relevant issues and the typical factor analysis methods as well as their advantages and disadvantages were discussed. Meanwhile, grey relational analysis (GRA) – a new multi-factor analysis in cardiovascular researches was reviewed and summarised for preparation of the GRA to do in PAF. (A) In accordance with the hypertension guideline (JNC-7) and Gallagher's definition of PAF, 94 cases with hypertension (HT) combined PAF were enrolled. Ventricular rate (VR) in PAF was taken as reference factor, and age, BMI, SBP and DBP as comparison factors for GRA; B. GRA formulae were: dimensionless general formula: Grey relational coefficient formula: Grey relational grade (GRG) formula: (C) GRA process was completed by using GRA software self-edited in SAS environment (SAS 10.0 version). (2) The other 105 cases met the diagnostic criteria of PAF monitored with dynamic electrocardiogram (DECG) for the purpose of obtaining the dynamic data of PAF. (A) From 10:00, the DECG record was divided into 48 1 min episodes. Each half-hour was taken as an ECG sample point. ECG episode at 10:00 was defined as the casual electrocardiogram (CECG). Grouping gist was that: (1) Depending on the f amplitude of CECG, cases were divided into coarse fibrillation group (group 1: V1f≥0.1 mm) and fine fibrillation group (group 2: V1f<0.1 mm). (2) According to VR of CECG, the cases were divided into slow group (group A, VR<60 bpm), control group (group B, VR 60–100 bpm) and the fast group (group C, VR>100 bpm); (3) Relying on diurnal index (DI) of VR, DI is the percentage decline of VR in nighttime, referred to the rule of ambulatory blood pressure monitoring (ABPM), 24 h DECG monitoring period was divided into daytime (06:30 to 22:00), nighttime (22:30 to 06:00) and full 24 h period, DI=((VRd–VRn)/VR d)×100%. In the formula, VRd=average daytime VR, VRn=average nighttime VR. On DI, PAF was divided into group α (DI<0), group β (DI=0–10%), group γ (DI>10% and<20%) and group δ (DI≥20%). Among DI groups, the differences of VR were analysed. (B) To trend charts and histograms of circadian VR rhythm; (C) The measurement data were expressed as ±SD. The coincident degree was expressed as percentage (%). The t test and the analysis of variance (ANOVA) were used to compare the differences among groups. (D) The coincident degree of VR or f wave, CECG with 24-h DECG, among VR groups and 2 f groups, was analysed. (E) The differences of VR among DI groups in every period were also analysed.

Results (1) The GRGs from cases of HT combined PAF were x1 (age) to x0 (VR): x2 (BMI) to x0 (VR): x3 (SBP) to x0 (VR): x4 (SBP) to x0 (VR): GR0 was. Thus, GRG of VR in PAF was mainly to SBP and DBP. (2) The coincidence degree between f groups showed that the f wave coincident degree in coarse fibrillation group was significantly higher than that in match group (89.22±15.21% vs 80.41±26.41%, t=2.032, p=0.046, 95% CI 0.007 to 0.170). Among VR groups, f wave coincidence degree did not show significant differences. VR coincident degree shown that the control group was the highest at 82.33±18.14%, significantly higher than the slow group (56.4±30.35%, p=0.000, 95% CI 0.135 to 0.383) and the fast group (39±31%, p=0.000, 95% CI 0.298 to 0.564). (5) By DI grouping analysis showed that the average 24 h VR, 10:00 VR

ANALYSIS METHODS ON CLINICAL DATA DRAWN FROM PERSISTENT ATRIAL FIBRILLATION

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Background The persistent atrial fibrillation (PAF) is one of the most common arrhythmia. Its incidence is increasing recently. PAF is an important issue in our social, economic life and it is also the primary clinical project. PAF possesses following features: multi-factorial, poly-trope, causation relation

and average daytime VR were all not significantly different among groups. Whereas the average nighttime VR showed differences among groups, which were group α (93.18±14.59 bpm) higher than the other three groups, respectively, those were group β 74.92±13.50 bpm (mean difference 18.26±4.24 bpm, p=0.000, 95% CI 9.846 to 26.670), group γ 67.36±11.80 bpm (mean difference 25.82±4.25 bpm, p=0.000, 95% CI 17.380 to 34.258), group δ 62.94±12.06 bpm (mean difference 30.24±4.77 bpm, p=0.000, 95% CI 20.771 to 39.705); group β was higher than group γ (mean difference 7.56±2.96 bpm, p=0.012, 95% CI 1.694 to 13.428) and group δ (mean difference 11.98±3.66 bpm, p=0.001, 95% CI 4.711 to 19.248). Between group γ and group δ, the average VR was not significantly different in nighttime.

Conclusions (1) GRA is an effective analysis method for PAF clinical data, which has broad application prospects. (2) In HT combined PAF patients, blood pressure, especially SBP, is an important factor affecting VR. (3) Coincident degree of 10:00 CECG with 24 h DECG shows coarse fibrillation is significantly higher than that in fine, suggesting that PAF classification depending on f wave type are not reliable. Of VR, coincident degrees in fast and slow groups are lower, suggesting that during medical management, for the two PAF groups, DECG monitoring should be done, and VR controlling should distinguish the different periods during 24 h. (4) DI-group analysis shows that VR in nighttime is significantly different among groups, suggesting that VR control strategy of PAF with different DI should be distinguished. (5) The results strongly suggest that DECG for PAF patients is required.