Long term changes of left ventricular geometric patterns in patients with CKD5D

Muriel Grooteman,[1] Tiny Hoekstra,[1] Volkan Doganer,[1] Michiel Bots,[2] Peter Blankestijn,[3] René van den Dorpel,[4] Otto Kamp,[1] Piet ter Wee, [1] Camiel de Roij van Zuijdewijn,[1] and Menso Nubé[1]

[1] VU University Medical Center, Amsterdam; [2] Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht; [3] University Medical Center Utrecht, [4] Maasstad Hospital, Rotterdam; The Netherlands.

Background and objectives

Abnormal LV geometry is common in CKD. While concentric LV hypertrophy (cLVH) predominates in non-dialysis CKD, eccentric LVH (eLVH) is most prevalent in CKD5D. Notably, the risk of sudden death is 5x higher in patients with eLVH than with cLVH. Since the risk of a dilated LV type is high in patients with fluid overload, over time we expected an increase in the proportion of patients with eLVH.

Design, setting, participants and measurements

Data from participants in the CONvective TRAnsport STudy (CONTRAST, NCT00205556), who underwent serial (M0, M6, M12 and M24) transthoracic echocardiography (TTE), were used. LV dimensions, LV mass (LVM) and relative wall thickness (RWT) were calculated. Patients were classified into 4 types of LV geometry: normal, concentric remodeling (CR), eLVH and cLVH. Patients who died and survived were compared. Long term changes in RWT and LVM, and thus in LV geometry, were assessed by a generalized linear mixed model (LMM) with a random intercept.

Results

328 patients (mean dialysis follow up 2.0 [1.0-4.0] years) were included. At baseline, LVH was present in 71%. The distribution of LV geometry is shown in table 1. Over time, 113 patients survived, 137 died, and 78 were censored alive. Patients who died were older, and suffered more frequently from an unfavorable LV profile and previous CVD (table 2). The longitudinal changes in the four LV geometric types are shown in figure 1: LVM increased in the in the groups without LVH and decreased in cLVH and eLVH.

Table 1: LV geometry at baseline, n(%)	
Normal geometry	57 (18%)
Concentric remodelling	36 (11%)
Concentric LVH	87 (27%)
Eccentric LVH	142 (44%)

Summary and hypothesis

1) eLVH was most prevalent at M0; 2) eLVH predominated in the group of non-survivors; 3) analysis by LMM showed only minor changes in the distribution of LV geometry over time The following hypothesis may explain these apparently paradoxical findings: over time, vulnerable CKD5D patients. progress to eLVH, which confers a high risk of dying. As a result, at the group level, LV geometry remains unaltered.

Table 2	Survivors	Non-survivors	p-value
Demographics			
Sex (male)	109 (55%)	92 (71%)	0,001
Age (years)	59 ± 14	69 ± 10	<0,001
Dry weight (kg)	71,9±14,6	73,3±14,0	0,86
Patient history			
Smoker (ever)	93 (56%)	78 (72%)	0,02
Prior CVD (yes)	76 (38%)	70 (54%)	<0,001
Kidney transplant	23 (11%)	8 (6%)	0,01
Hemodynamics			
Syst BP (mmHg)	149 ± 21	148 ± 22	0,66
Diast BP (mmHg)	77 ± 12	75 ± 11	0,003
LVEDD (mm)	50 ± 7	52 ± 8	0,02
LVESD (mm)	32 ± 8	35 ± 9	0,001
LVM (g)	199 ± 66	217 ± 68	0,02
Ejection fraction (%)	65 ± 14	60 ± 15	0,003

Post-scriptum

Participants survived not only the transition from advanced CKD to CKD5D, but also 2 years of dialysis treatment. Since only the fittest patients stay alive, inclusion may be biased by survival. As TTE was performed with great intervals, many patients died without a recent TTE. Only a well-designed prospective study (TTE every 4 months) may reveal whether and how LV geometry evolves in long term CKD5D patients.

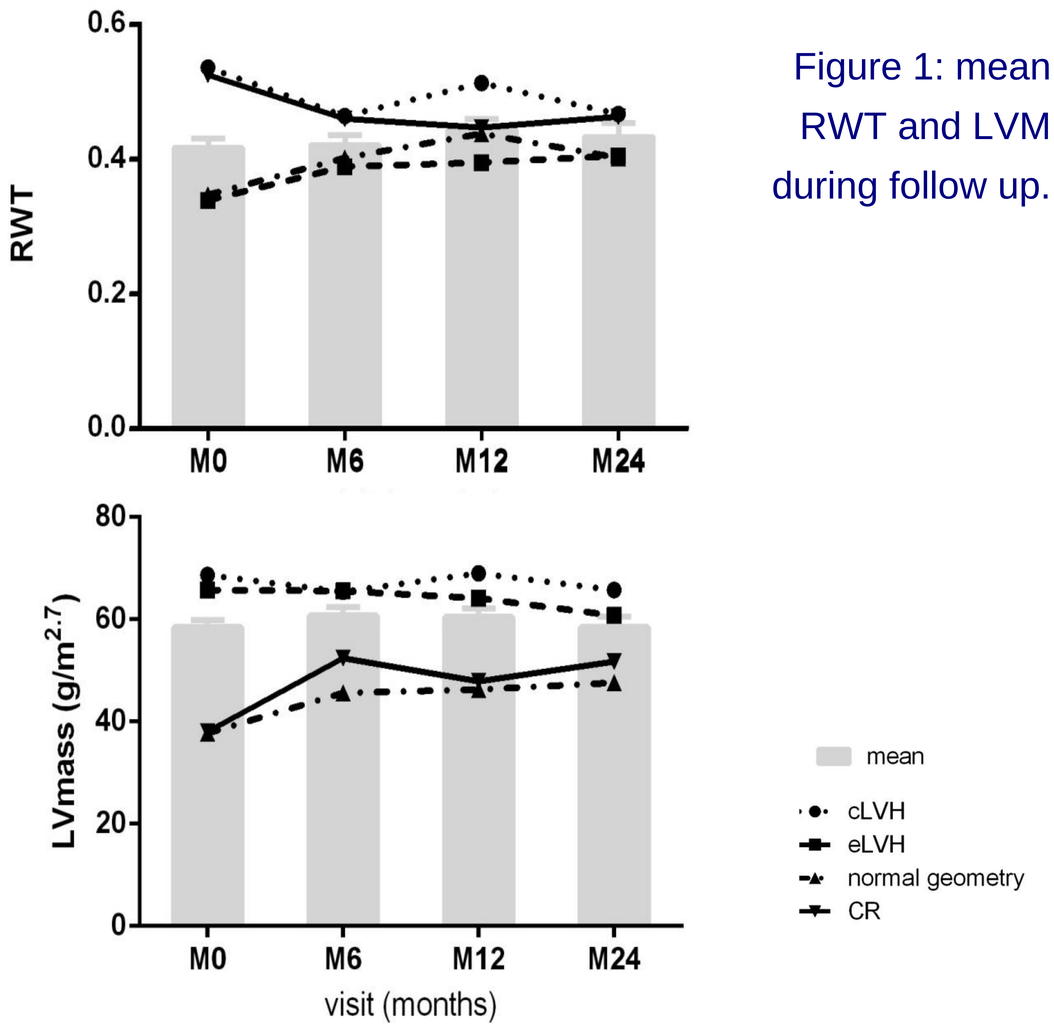

Figure 1: mean RWT and LVM during follow up.

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