CIRCULATING ENDOTHELIAL CELLS AND ENDOTHELIAL-DERIVED VESICLES IDENTIFICATION IN PATIENTS WITH INFANTILE HEMANGIOMA: A PROSPECTIVE COHORT STUDY.

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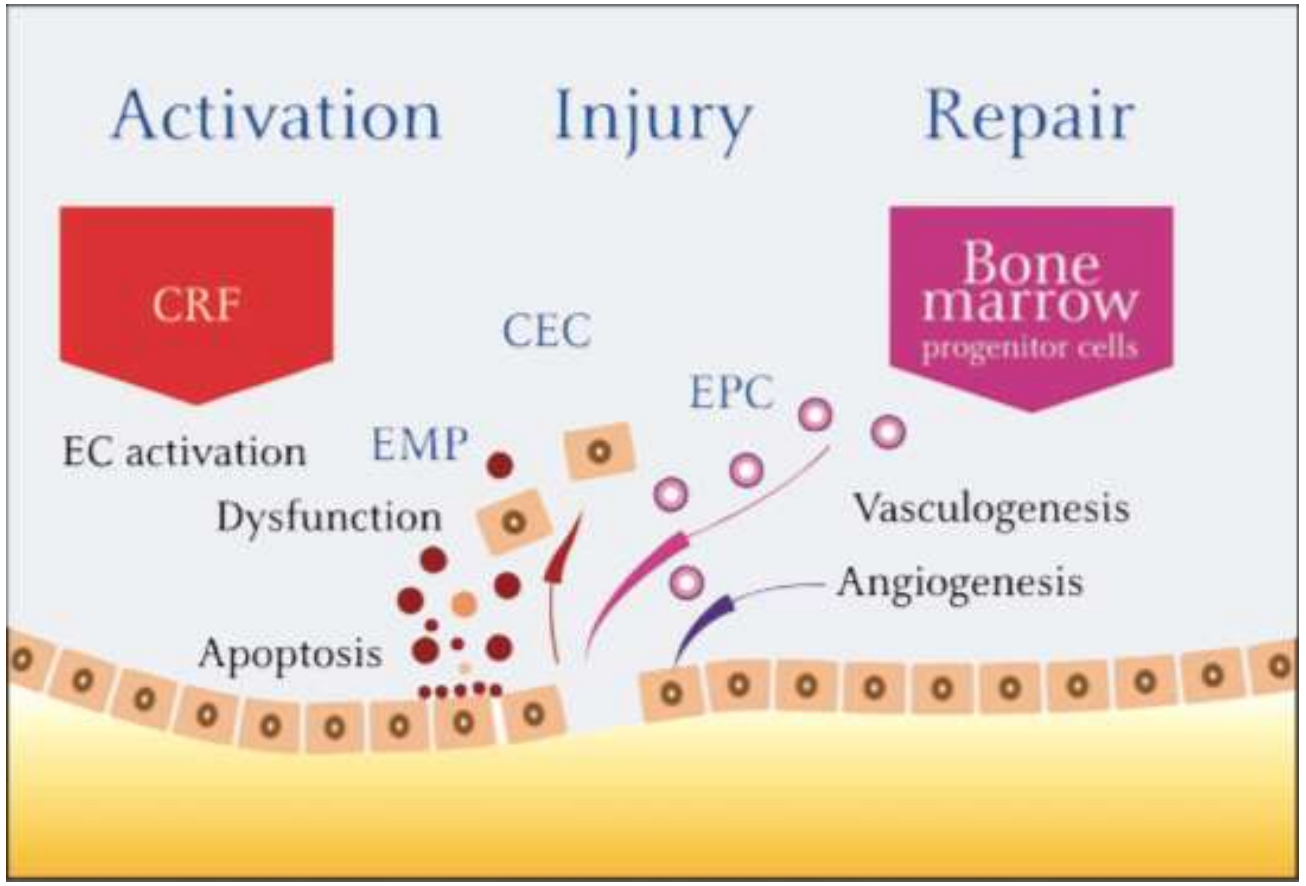
ENDOTHELIAL HOMEOSTASIS

- Equilibrium among **Circulating Endothelial Cells** (CECs), **Endothelial Progenitor Cells** (EPCs), **Hematopoietic Stem Cells** (HSCs) and **Endothelial-derived Extracellular Vesicles** (EVs).



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STUDY DESIGN

BACKGROUND

- The endothelium is a dinamic system
- Responds to physiological and pathological changes
- Tumors require neoangiogenesis → mobilization of CECs, EPCs and EVs

- Infantile Hemangioma is a VASCULAR TUMOR

CECs, EPCs, HSCs and EVs changes may be used as markers of IH evolution

AIMS OF THE STUDY

• PRIMARY

- ✓ Variations in **CEC concentration** in children with IH *versus* healthy controls
- ✓ Changes in concentration of **endothelial cEVs and/or their cargo** (through the proteomic analysis) in children affected by IH *versus* healthy controls

• SECONDARY

- ✓ Changes of **hemangioma-derived CEC** concentration after treatment with **oral propranolol**
- ✓ Changes in **hemangioma-derived cEVs** concentration and content after treatment with **oral propranolol**.

METHODS

- Cases and Controls were enrolled from the Dept. of Pediatric Surgery of Pescara
- For each patient a blood sample was collected (1 EDTA for CECs and 1 Sodium Citrate for EVs)

	CASES	CONTROLS
INCLUSION CRITERIA	• Infantile Hemangioma at any stage of development • Any sex • Any age	• Any sex • Age <12 years
EXCLUSION CRITERIA	• Presence of an unrecognized vascular malformation • Oncological and/or hematological disorders	• Age >12 years • Oncological and/or hematological disorders

RESULTS

DEMOGRAPHICS

	All patients (n=22)	Cases (n=15)	Controls (n=7)	p value
M:F	10:12	4:11	6:1	
GA (mean±SD) (range)	37,06 ± 3,071 (32-41)	37,91 ± 3,081 (32-41)	36 ± 2,708 (32-39)	0.1256*
BW (mean±SD) (range)	2880 ± 846,3 (1320-4290)	3135 ± 770,1 (2070-4290)	2455 ± 856,8 (1320-3500)	0.1229*
Vaginal delivery (n/all)	7/22	5/15	2/7	>0,9999§
Respiratory distress (yes)	4/17	4/15	0/7	0,2632§

*Student's *t*-test; § Fisher's exact test.

1 patient underwent a blood sample pre- and post- oral propranolol administration.

RESULTS

CASES *versus* CONTROLS

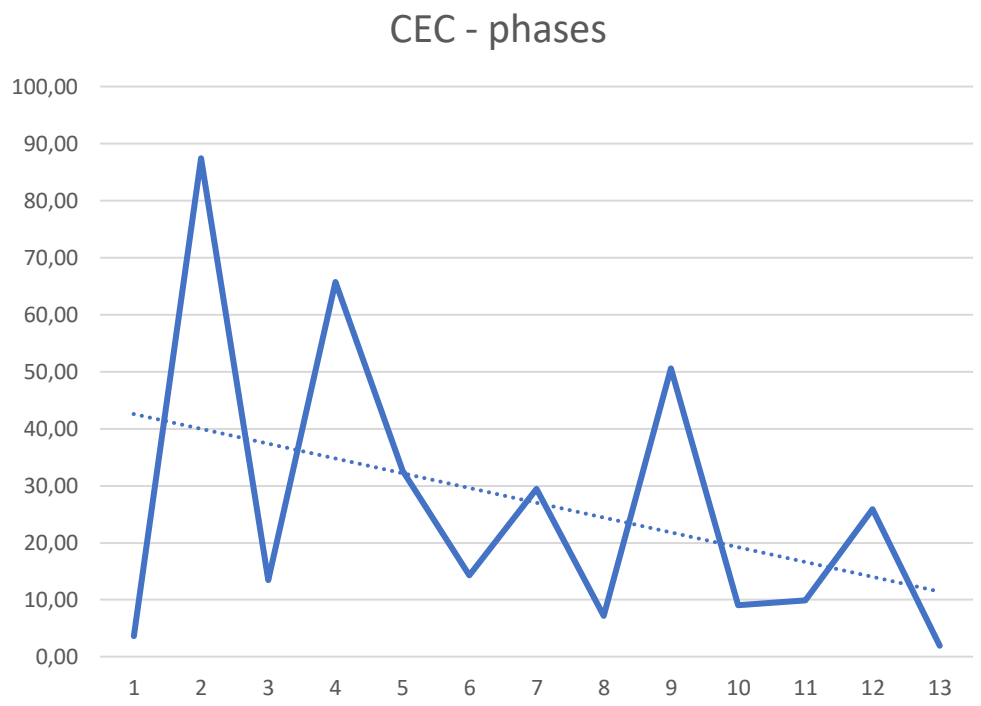
	Cases (n=15)	Controls (n=6)	p value
CEC (mean ± SD) (range)	36,5 ± 43,55 (1,96-159,8)	8,732 ± 8,783 (0-20,17)	0.1444
HSC (mean ± SD) (range)	4866 ± 5359 (647,4-18983)	1503 ± 1713 (79,39-45,46)	0.1549
EV CD31+/µl (mean ± SD) (range)	117,7 ± 211,8 (0-700,00)	121,8 ± 206,9 (0-617,4)	0.9642
EV CD133+/µl (mean ± SD) (range)	86,05 ± 115,9 (2,8-355,6)	36,93 ± 75,67 (0-222,6)	0.2907

Mann–Whitney *U* test.

RESULTS

CASES – *Phases of IH development*

ID	DOB	Gender	Phase of IH	CEC (n)	HSC (n)
HRA_16	01/01/20	F	proliferation	87,43	3906,91
CM_22	08/07/20	F	proliferation	32,6	3495,79
RR_9	16/06/19	M	proliferation	65,73	18982,97
DMA_12	20/01/19	F	proliferation	50,61	3197,01
GD_11	31/07/19	F	proliferation	13,48	4210,24
TM_23	14/05/20	F	proliferation	29,44	2637,97
AI_15	19/05/19	F	quiescence	7,20	2800,75
MD_24	25/11/19	M	quiescence	9,02	1399,82
PC_20	16/07/19	F	involution	159,83	14478,02
VE_06	06/10/12	M	involution	25,86	2218,27
HRA_18	01/01/20	F	involution	14,28	2066,56
DCS_13	13/07/17	F	involution	9,91	647,43
DBA_8	18/07/19	M	involution	3,67	7236,06



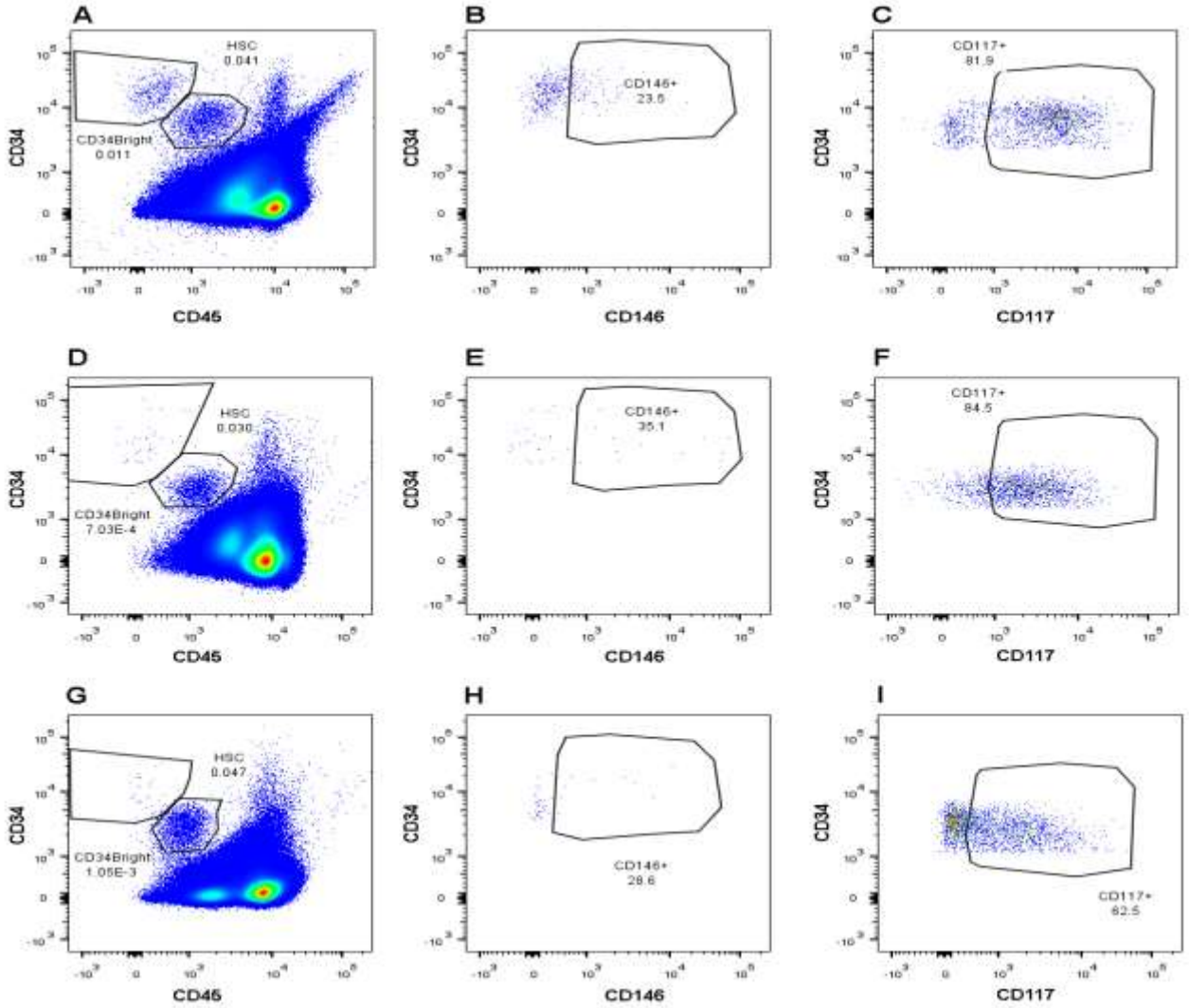
RESULTS

Pre- and post- oral propranolol administration

PRE

POST (3months)

CONTROL



CONCLUSIONS

- CECs as marker of progression of disease
- Number of HSCs higher in cases than controls
- Propranolol may influence the number of CECs and HSCs
- Number of EVs may not represent a marker of the disease → proteomic studies

THANK YOU!

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