



Fontan Surgery and Pregnancy: How to support from preconception to the future

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I have no disclosure.

ACHD GUCH



Background

- ❖ **Pregnancy under Fontan circulation has not been clearly analysed yet from haemodynamic point of view with regard to clinical outcome, although it is considered having significant risk of maternal mortality and severe morbidity.**

WHO risk group III

- ❖ **It is important to integrate the data worldwide and to establish how to manage pregnancy in patients after Fontan surgery.**

Objectives

- ❖ **To scrutinize clinical feature before, during, and mid – long term after pregnancy in women with Fontan circulation.**
- ❖ **To utilize cardiac data for patient-selection, for management during pregnancy , and for the future/life-long cardiac aspect.**

Material and methods

❖ **13** pregnancies (live births) in
12 patients (Fontan mothers)
1996 – 2015, at T.W.M.U.

***7 miscarriages/4 patients excluded**

= 35%

***retrospective data from medical records
NYHA, Sat, BNP, ECHO, catheter, Fontan liver etc.**

Results-1: Pt characteristics in **preconception**

No	Diagnosis	Age	NYHA	Sat	AVVR	ARR	V-EF, SF	Liver	AC
1	d-TGA, hypo RV	30	I	95	-	AT	- 38	con	-
2	TA	31	I-II	98	-	Ch-Af	42 -	fib	A
3	TA	35	I	95	-	-	45 -	fib	-
4	SLV	32	I	96	-	-	- -	con	-
5	<u>Asp.</u> AVSD	23	I	92	-	-	50 29	-	-
6	SRV	30	I	96	-	PMI	55 38	-	A
7	<u>Polysp.</u> I-TGA	28	II	88	mod	-	52 -	cirr	A
8	<u>Polysp.</u> AVSD	23	I-II	95	-	-	- 29	fib	-
9	PPA	39	I	96	-	-	49 -	con	A
10	SRV 1 st	18	I	96	mod	-	50 25	con	A
11	SRV 2 nd	21	I	96	mod	-	- -	con	A
12	<u>Polysp.</u> SRV	18	I	94	mod	-	48 -	n.p.	A
13	SRV	24	I	98	-	-	48 27	fib	-

Htx 31%

27

95 25% 23% 49% 42% 50%

Results-2: clinical course **after** conception to delivery

No	Diagnosis	Adm w	Deliv w	mode	anae	c-OBGY	c-Car	BWg	
1	d-TGA, hypo RV	37	38	elCS	GA	-	AT	2355	
2	TA	29	29	emCS	GA	bleeding	-	1700	
3	TA	25	35	elCS	GA	threat P	-	2244	
4	SLV	24	36	elCS	CSEA	threat P	-	2404	
5	<u>Asp</u> AVSD	29	32	VD	-	threat PL	-	1724	
6	SRV	32	32	elCS	CSEA	threat P	-	1611	
7	<u>Polysp</u> l-TGA	35	37	elCS	CSEA	-	h.f.	2108	
8	<u>Polysp</u> AVSD	26	32	elCS	CSEA	threat P	-	2003	*
9	PPA	23	35	elCS	CSEA	threat P	-	1563	
10	SRV 1st	31	35	elCS	CSEA	-	-	2498	*
11	SRV 2 nd	24	29	emCS	GA	+PROM	-	1023	
12	<u>Polysp</u> SRV	23	29	VD	-	threat PL	-	1316	
13	SRV	33	35	elCS	CSEA	-	h.f.	2049	*
* AFD, death(-) TE(-)		29	33	85%	64%	62%	23%	1892	

Results-3: cardiac events **long after** pregnancy

❖ Heart failure/V-dysfunction	3 (25%)
❖ TCPC cvn ± PMI	2 (17%)
❖ TE-event	2 (17%)
❖ PMI only	1 (8%)
	<hr/>
	8 (67%)

in Pt No.1,2,3 &5

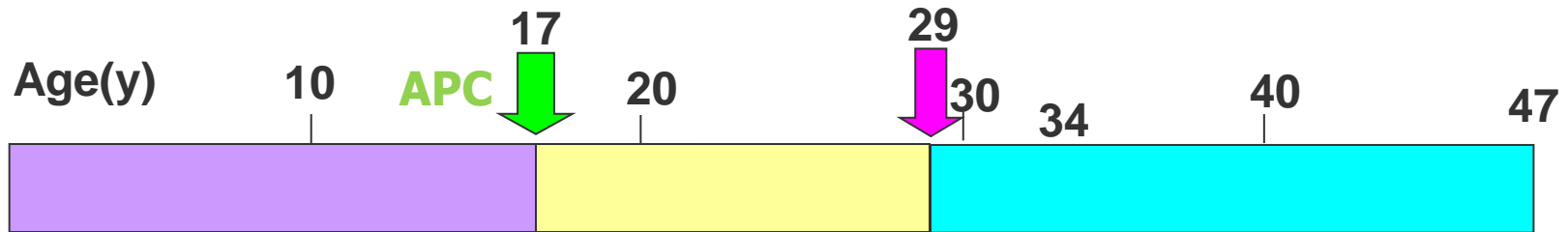
No strong evidence of pregnancy-related effect on the late cardiac complications as above.

Fontan

Preg



Long term outcome :Pt No.1



Dextrocardia {S,X,L} NYHA I
Concordant CCH
TGA,VSD,PS



CVP 10, LVEDP 7, LVEF 46%
Sat 95%, C.I. 3.0 l/min/m²
BNP 61

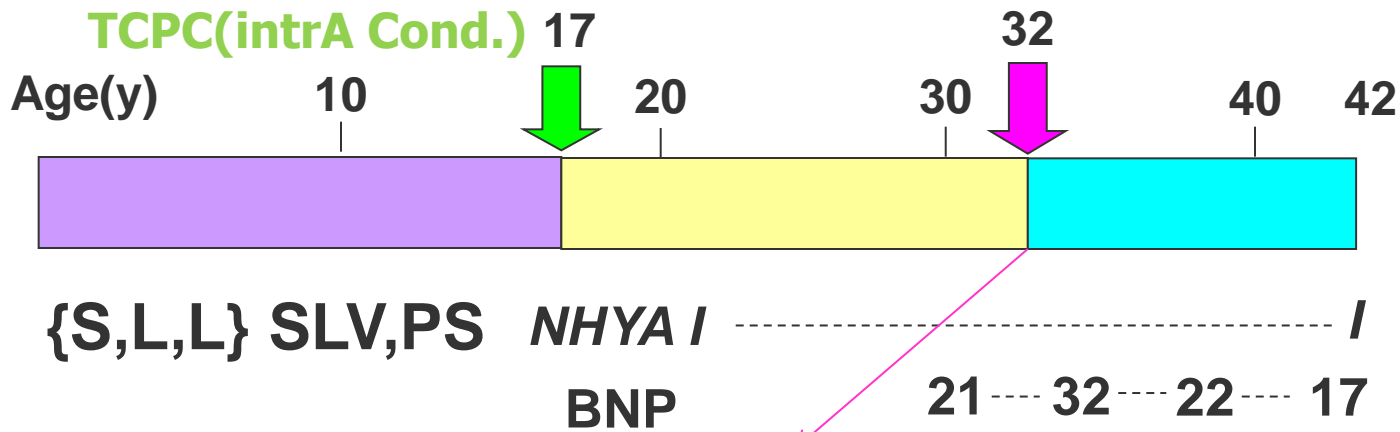


Fontan

Preg.



Long term outcome :Pt No.4



Results-4: cardiac catheter data in **pre**conception

Ventricular volume (ml/m ²)	97 ± 32
EF (%)	50 ± 4
CVP (mmHg)	11 ± 3
PCWP (mmHg)	8 ± 2
C.I. or Qs (l/min/m ²)	2.2 ± 0.5
Rp (WoodUnit·m ²)	1.2 ± 0.8

N=9

**Standard haemodynamics
in good Fontan**

Valsalva Manoeuvre on Fontan Patients - Catheter data -

BP_{mmHg} 100 → 93

HR_{bpm} 62 77

CI_{l/min/m²} 1.8 → 1.1

PAP_{mmHg} 8 36

PVP_{mmHg} 6 28

- **VM for 15 sec**
- **n = 3 x 15 Pt**
- **NHYA I**
- **NSR**
- **No desaturation**

simultaneous recording

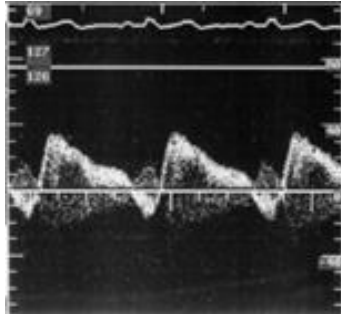
Valsalva Manoeuvre (VM) on Fontan - flow catheter data -

pre

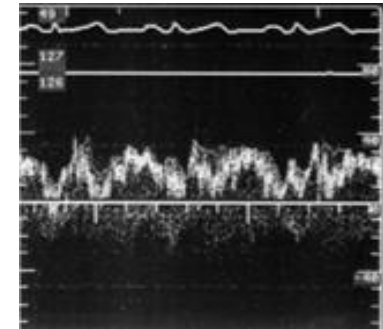
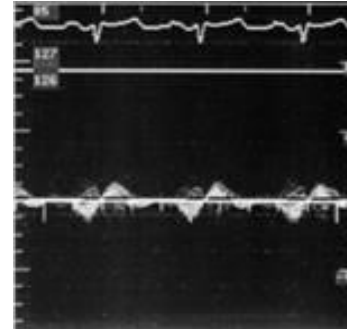
VM 15sec

OFF

IVC

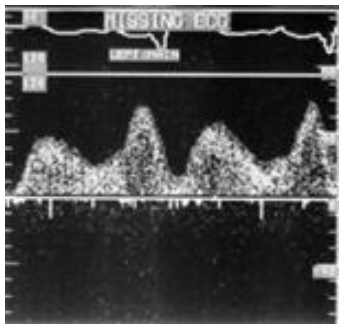


Pressure study
(9) → (34)
mmHg

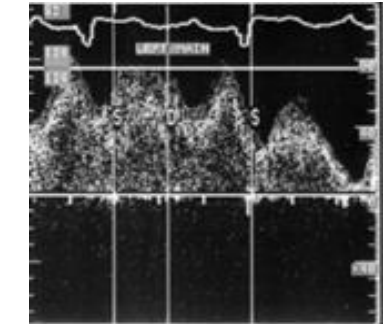
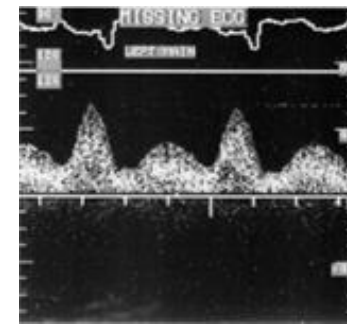


PA

Lt, Up

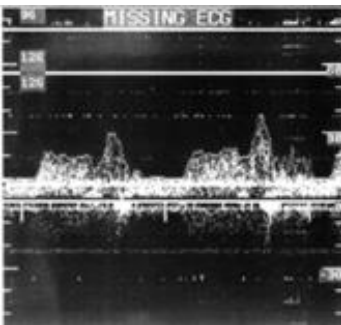


(8) → (36)

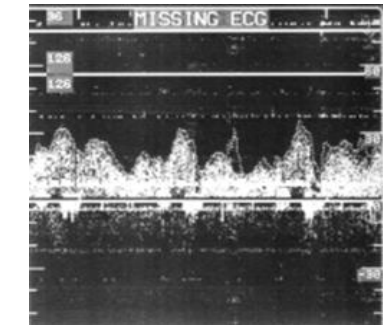
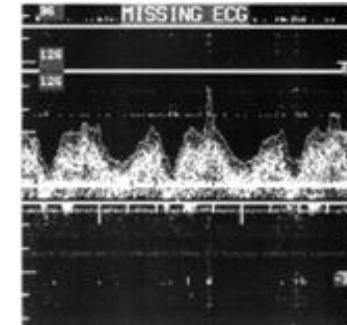


PV

Rt, Low



(6) → (28)



deep insp.

Conclusions

- ❖ **Successful pregnancy in women with Fontan circulation practically requires highly experienced management, but is possible, when patients are carefully selected, and when they understand maternal/fetal risks before pregnancy.**
- ❖ **For patient selection, haemodynamic study such as catheter data is useful .**
- ❖ **Early admission often contributes to reach longer gestation in Fontan patients.**
- ❖ **In addition, life-long outcome late after pregnancy is important for their tailor-made plan for life including reoperation.**