Squat Echocardiography in Tetrology of Fallot: A new “Dynamic-Echo” modality to assess the hemodynamics and predict spells!

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Newer insights about Echodyanmics in TOF!
Tetrology of Fallot – Before squatting

- Reduced pulmonary flow
- Increased aortic flow
Tetrology of Fallot – After squatting

Increased pulmonary flow → Reduced aortic flow

Increased venous return (sustained squatting)
In over 50 years of clinical echocardiography, little data of intra cardiac blood flow during squatting is available!

We postulated that doppler can be an useful tool to assess the reduction in R–L shunt during squat.
In this context dynamic echocardiography was performed five patients with TOF.

*Echo was done in basal standing posture and on sustained squatting. In one patient echo was performed during a spell.*

The following parameters were measured. Apart from routine measurements (*RVOT flow, Aortic flow velocity, shunt across VSD were recorded*)
Observation (Echo findings from standing to squatting)

The mean gradient of RVOT reduced from 68 to 46mmhg.

The aortic flow velocity reduced from 1.3 to 1m/sec.

In absolute terms the RVOT gradient regressed by 28-42% and aortic flow velocity reduced by 20-30%.

The RA, RV dimension marginally increased.
Further observations . . .

• The shunt across the VSD was assessed using color M mode imaging. It showed distinct change in the normal bi-modal shunt pattern with a new color streak from LV to RV.

• There was *no significant* increase in the left heart chamber dimension. It was difficult to get the accurate gradient across RVOT during a spell.

• One patient who failed to show squatting induced reduction of RVOT gradient, *later developed a spell* within 48-72 hours.
Conclusion

Squat Echocardiography is a “A simple modality” to study the intricacies of hemodynamics during squatting in TOF.

Further, it can be useful in:

1. Grading the dynamic RVOT obstruction.
4. Assess the therapeutic response.
Key Messages to Forget!

Failure of squat induced reduction of aortic gradient *predicts* an impending spell or imply severe forms of TOF.

A minimum of 25% reduction of RVOT gradient / aortic flow velocity *is expected* on squatting.

This response suggests RVOT anatomy is *less vulnerable* for hypoxic crises and possibly a better surgical outcome.

Thank you . . . for your time

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