NON INVASIVE ULTRASONOGRAPHY ASSESSMENT

OF CORONARY FLOW RESERVE

IN *HALOBATRACHUS DIDACTYLUS*

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EXTENDED ABSTRACT ONLY – DO NOT CITE

Introduction

Coronary blood flow in fish is a difficult issue to access. Different methods have been applied and most available data depend on myocardial oxygen consumption.

Teleost coronary arteries are branches of the hypobranchial arteries, which derive blood from efferent branchial arteries; some species may derive an additional coronary supply from caudal coronary arteries of dorsal aortic origin (Watson and Cobb, 1979). The coronary artery in *Halobatrachus didactylus* derives from anterior hypobranchial system (Benitez et al., 1994).

Fish coronary flow physiology is not fully understood. Coronary vasodilator reserve in resting rainbow trout has been estimated in about 200% (Davie and Farrell, 1991).

Ultrasonography, as previously described in *Halobatrachus didactylus*, is an established, confirmed, reliable non-invasive technique able to study heart morphology, blood flow and ventricle function. Intravenous contrast agents improve Doppler signal-to-noise in vessels, enhancing signal amplitude (Schlief et al., 1994).

It is our objective to apply a new ultrasonographic technology in a non-invasive way to assess coronary flow reserve (CFR) in *Halobatrachus didactylus* (teleost fish) similar to what has been described in humans (Caiati et al., 1999).

Material and Methods

Six specimens of *Halobatrachus didactylus* were caught at Ria Formosa lagoon, Algarve, Portugal**.** Fishes were kept alive, after anaesthetised, using a water circulation device. Ultrasonographic data was acquired using an echo camera Acuson Sequoia with 15 MHz frequency emission linear probe (Coucelo et al., 1996). Coronary artery flow was identified and enhanced with contrast agent Levovist® (Shering); Contrast, in a concentration of 200 mg/ml, was injected intravenously (0.25 ml/kg); Doppler blood flow spectrum records were obtained in basal condition and after intra peritoneal adenosine administration (3mg/ml; 1ml/kg)(Figure 1). Coronary flow reserve was calculated as the ratio of hyperaemic to basal peak of diastolic flow velocity.

Results and Discussion

In basal conditions, coronary flow velocity for this specie was 18.9±2.3 cm/s. Maximum coronary flow reserve was observed 2 min after adenosine injection (table 1).

Table 1. Coronary flow reserve in *Halobatrachus didactylus*

	Basal	**Adenosine**		
	0 min	1 min	2min	3min
Peak diastolic velocity (cm/s)	18.9±2.3	23.0±1.2	32.7±4.6	23.4±0.9
CFR (%)	**-**	122	173	123

These preliminary results show that although, very much dependent on the operator, this new approach is sensitive, reproducible and opens a new perspective of coronary flow physiology investigation.

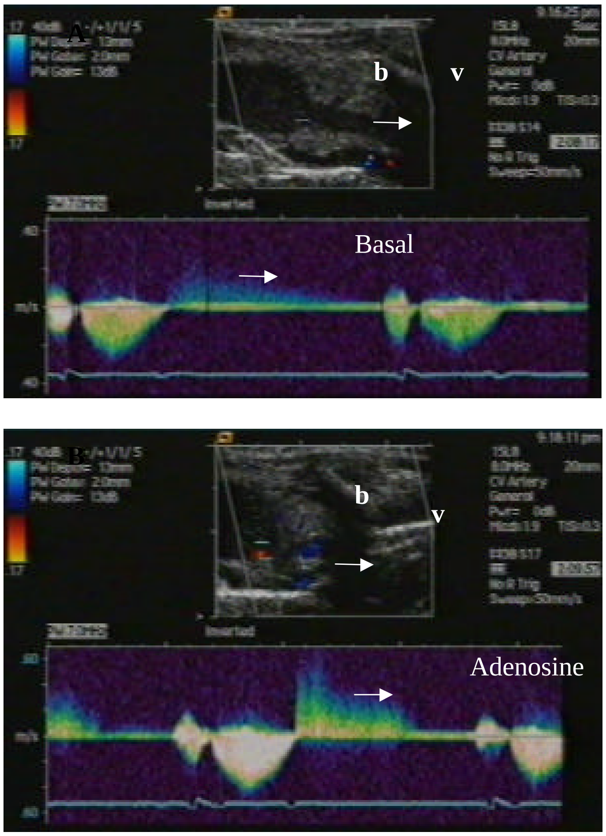

Figure 1 – Echocardiographic images with Doppler velocity record of coronary flow in basal conditions (A) and after adenosine injection (B); two-dimensional images in long-axis of the ventricle (v) and bulbus (b); white arrow indicate coronary flow.

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