

## COMMENTARY TO HABILITATION THESIS<sup>1</sup>

Congenital heart defects (CHDs) are very common defects in fetuses and in children. The prevalence of CHDs varies from 6 to 10 per 1000 live births. 35% of CHDs are critical CHDs. Neonates born with critical CHDs often need to be treated immediately after birth: some of them need some medication, the others need to be treated by cardiac catheterization or by surgery. To be prepared to take care of such patients soon after birth, we need to diagnose critical CHDs prenatally.

In the Czech Republic, the nationwide prenatal cardiac screening program during the second trimester was introduced in 1986. This Habilitation Thesis is divided into 7 parts. After the introduction, the second part is focused on the organization and the results of the second trimester screening program in Czechoslovakia (later in the Czech Republic) from 1986. This part of the Habilitation Thesis also deals with first-trimester screening, and with the difficulties and limitations of screening during the first trimester.

The third part of the Thesis focuses on left heart lesions, severe CHDs, which can be detected by screening – aortic stenosis (AS), hypoplastic left heart syndrome (HLHS), and coarctation of the aorta (COA). Possible fetal interventions in this group of fetal patients are presented as well. Very rare congenital heart abnormalities are discussed in the fourth part of the Thesis, congenital complete heart block in the fifth part, and associated genetic abnormalities in the sixth part.

The main aim of the study was to assess the impact of first trimester screening on the spectrum of CHDs and the outcomes of fetuses with CHD later in pregnancy. The first trimester ultrasound screening program was implemented in the Southern Moravia region in most fetal medical centres by 2003. The spectrum of CHDs, associated comorbidities and outcome of fetuses, either diagnosed with CHD in the first or only in the second trimester in the South Moravian region of the Czech Republic, were compared retrospectively from 2007 to 2013. Fetuses diagnosed with CHD between 2007 and 2013 in the second trimester were also compared with fetuses diagnosed with CHD in the second trimester between 1996 to 2001, the period before first-trimester screening was introduced.

Our results confirmed the significant impact of first-trimester screening on the spectrum of CHDs later in pregnancy and on the outcomes of pregnancies with a CHD, in that more severe forms of cardiac abnormalities and higher comorbidities resulted in an increase in early termination of first-trimester pregnancies. In the second trimester, less severe forms of cardiac

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<sup>1</sup> The commentary must correspond to standard expectations in the field and must include a brief characteristic of the investigated matter, objectives of the work, employed methodologies, obtained results and, in case of co-authored works, a passage characterising the applicant's contribution in terms of both quality and content.

abnormalities were diagnosed. These fetuses had better postnatal outcomes because of more frequent biventricular circulation and fewer associated comorbidities.

This Habilitation Thesis is designed as a commented collection of publications with the candidate being either the main author of five manuscripts, (in one case, the publication has two main authors who contributed equally), or the co-author significantly contributing to twelve manuscripts. All manuscripts were published in their final version in the relevant medical journals or books. International medical journals where the manuscripts were published had an impact factor >18 in one case, IF >14 in two cases, IF >5 in three cases, and IF from 1.43 to 4.7 in four cases.

Keywords: prenatal cardiology, fetus, first-trimester screening, congenital heart defect, fetal arrhythmia

**[1]** Jicinska H. Prenatální kardiologie v České republice. Cesko-Slovenska Pediatrie. 2010;65(11):623-625

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	100%	100%	

**[2]** Tomek V, Marek J, Jicinska H, Skovranek J. Fetal Cardiology in the Czech Republic: Current Management of Prenatally Diagnosed Congenital Heart Diseases and Arrhythmias. Physiological Research 2009;58(2):159-166

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	25%	25%	25%

**[3]** Tomek V, Jicinska H, Gilik J, Skovranek J, Navratil J, Janousek J. Prenatal diagnosis of congenital heart defects in the Czech Republic during the years 1986-2012. Actual Gyn 2014; 6:67-72

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	20%	20%	20%

**[4]** Tomek V, Gilik J, Jicinska H, Pavlicek J, Navratil J, Cutka D, Vlasin P, Lacinova M, Marek J, Skovranek J. Prenatal detection of congenital heart defects and its consequences. Cesko-Slovenska Pediatrie 2018;73(5):284-290

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	20%	20%	20%

**[5]** Jicinska H, Vlasin P, Jicinsky M, Grochova I, Tomek V, Volaufova J, Skovranek J, Marek J. Does First-Trimester Screening Modify the Natural History of Congenital Heart Disease? Analysis of Outcome of Regional Cardiac Screening at 2 Different Time Periods. *Circulation* 2017;135:1045-1055

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	80%	100%	80%

**[6]** Gardiner H.M., Kovacevic A., Tulzer G., Sarkola T., Herberg U., Dangel J., Öhman A., Bartrons J., Carvalho J.S., Jicinska H., Fesslova V. Averiss I., Mellander M., Fetal Working Group of the AEPC. Natural history of 107 cases of fetal aortic stenosis from a European multicenter retrospective study. *Ultrasound in Obstetrics and Gynecology* 2016; 48:373-381

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	7%	7%	7%

**[7]** Kovacevic A, Öhman A, Tulzer G, Herberg U, Dangel J, Carvalho J S, Fesslova V, Jicinska H, Sarkola T, Pedroza C, Averiss I E, Mellander M, Gardiner H, the Fetal Working Group of the AEPC. Fetal hemodynamic response to aortic valvuloplasty and postnatal outcome: a European multicenter study. *Ultrasound in Obstetrics and Gynecology*; 2018, 52:221-229

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
		7%	7%

**[8]** Navratil J, Jicinska H, Jelinek Z. Výskyt a osudy plodů se syndromem hypoplastického levého srdce na území Moravy a Slezska v letech 2002 a 2003. *Cesko-Slovenska Pediatrie*. 2005; 60(7):393-396

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	90%	40%	40%

**[9]** Matsui H, Mellander M, Roughton M, Jicinska H, Gardiner H. Morphological and Physiological Predictors of Fetal Aortic Coarctation. *Circulation* 2008;118: 1793-1801

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	20%	30%	20%

**[10]** Jowett V, Aparicio P, Santhakumaran S, Seale A, Jicinska H, Gardiner HM. Sonographic predictors of surgery in fetal coarctation of aorta. *Ultrasound in Obstetrics nad Gynecology*; 2012; 40:47-54

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	10%	16%	16%

[11] Jičínská H, Tax P, Pádr R, Jičínský M, Marek J. Rare congenital umbilical arteriovenous malformation. *European Heart Journal Cardiovascular Imaging* [online]. 2020; 21(10):1172. doi:10.1093/ehjci/jeaa102

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	80%	90%	

[12] Fotaki A, Novaes J, Jicinska H, Carvalho J S. Fetal aortopulmonary window: case series and review of the literature. *Ultrasound in Obstetrics & Gynecology*[online].2017; 49(4):533-539. ISSN 0960-7692. doi:10.1002/uog.15936

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	25%	25%	25%

[13] Krupickova S, Rigby M L, Jicinska H, Marais G, Rubens M, Carvalho J S. Total anomalous pulmonary venous connection to unroofed coronary sinus diagnosed in a fetus with spinal muscular atrophy Type I. *Ultrasound in Obstetrics& Gynecology*. [online]. 217;50(5):657+. ISSN 0960-7692. doi:10.1002/uog.17432

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	16%	20%	

[14] Eliasson H, Sonesson S E, Sharland G, Granath F, Simpson M S, Carvalho J S, Jicinska H, Tomek V, Dangel J, Zelinsky P, Respondek-Liberska M, Freund M W, Mellander M, Bartroons J, Gardiner H M. Isolated Atrioventricular Block in the Fetus. A retrospective multinational, multicenter study of 175 patients. *Circulation* [online]. 2011;124(18):1919-1926. ISSN 0009-7322. doi:10.1161/CIRCULATIONaha.111.041970

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	8%	10%	8%

[15] Jicinska H, Marek J, Brysova V, Gaillyova R, Kuglik P, Tlaskal T, Litzman J, Tax P, Navratil J. Delece chromozomu 22q11 u vrozených srdečních vad. *Cesko-Slovenska Pediatrie*. 1998;53(11):659-664

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	80%	100%	

**[16]** Tomek V, Jicinska H, Klaskova E, Jehlicka P, Balatka P, Vit P, Hecht P, Reich O, Janousek J. Expert consensus statement on prenatal cardiology organization in the Czech Republic. Prepared by the Working Group on Pediatric Cardiology of the Czech Society of Cardiology. *Cor et Vasa* 2020; 62(1): 60-62

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	40%	50%	45%

**[17]** Zatocil T, Antonova P, Rubackova, Popelova J, Zakova D, Pokorna O, Chaloupecky V, Rohn V, Skalsky I, Jicinska H, Taborsky M, Kautzner J, Janousek J. Doporučení pro organizaci péče o vrozené srdeční vady v dospělosti v České republice. *Cor et Vasa* 2018;60(3): e331-e334

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
	15%	20%	7%

<sup>1</sup> Soubor **uveřejněných** vědeckých prací nebo inženýrských prací, doplněný komentářem. Komentář v rozsahu odpovídajícím standardní situaci v oboru přiměřeně podrobně charakterizuje stav problematiky, cíle práce, použitou metodiku, dosažené výsledky a v případě prací se spoluautory i kvantitativní a obsahový autorský podíl uchazeče.