



Increasing incidence of congenital hypothyroidism in neonatal screening program in Central Serbia - 30 years of experience

Milenković T¹, Mitrović K¹, Todorović S¹, Vuković R¹, Zdravković D^{1,2}

¹Institute for Mother and Child Health Care of Serbia "Dr Vukan Čupić", Belgrade, Serbia

²Medical Faculty University of Belgrade, Serbia

INTRODUCTION

Congenital hypothyroidism (CH) is the most common congenital endocrine disease and avoidable cause of severe mental retardation.

Over the past three decades, increasing overall incidence rate of children with both permanent and transient forms of CH has been observed, particularly for cases with a normal located thyroid gland and milder dysfunction.

The reasons for this remain unclear, but may relate to changes in population ethnic composition, environmental changes, iodine deficiency and diagnostic changes, such as changing screening program methodology and TSH cutoff (CO) levels.

OBJECTIVE

The aim of the study was to compare incidence of CH in the first 16 years of screening from 1983 to 1998 (period 1) with the last 15 years of screening from 1999 to 2013 (period 2).

We also investigated the impact of the TSH CO change on incidence of CH.

MATERIAL AND METHOD

Neonatal TSH screening program for CH in Central Serbia was introduced in 1983 by determination of the TSH level in dried filter paper blood spots of the 3rd to 5th day of life.

TSH cut off (CO) levels were changed over time. From 1983 to 1988 TSH CO measured by RIA was 30 mU/l. From 1988 to 1998 CO measured by IFMA was 15 mU/l. From 1999 TSH was measured by DELFIA: from 1999 to 2006 CO was 10 mU/l and from 2007 was 9 mU/l.

Overall incidences were calculated, and period 1 and period 2 were compared.

CONCLUSIONS

The overall incidence of congenital hypothyroidism in Central Serbia during past 30 years almost tripled, with significant increase in almost all etiological categories.

Lowering TSH CO levels during study period allowed the detection of severe and mild cases of hypothyroidism, which would have been missed using previous CO level.

Most prominent finding in our study was significant increase in the incidence of transient CH.

Further investigations are needed to reveal other contributory factors important for increasing incidence of CH in Serbia.

CONTACT

Tatjana Milenkovic, MD, PhD
Institute for Mother and Child Health Care of Serbia
"Dr Vukan Cupić" Belgrade, Serbia

Email: tanjamil5e@gmail.com
Phone: +381 11 3108 193

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RESULTS

During the study period from January 1983 to January 2014 a total number of 1 547 122 newborns have been screened for CH.

Congenital hypothyroidism was detected in 434 children, 59.9% (n=260) female and 40.1% (n=174) male. Among children with CH, 315 were found to have permanent CH, 68 had proven transient CH, 16 were lost for follow up and reevaluation was not performed in 35 children due to age less than 3 years.

Increasing incidence of both permanent and transient CH was remarkable. Overall incidence of congenital hypothyroidism was 26.8 per 100 000 (1:3728), with highest incidence of 71.6 per 100 000 in 2001 (1:1397) (Figure 1).

During the first 15 years of screening program (period 1), diagnosis of CH was established in 112 patients and incidence was 16.2 per 100 000 (1:6158). During this period, frequency of transient CH was 0.9%.

In the next 15 years (period 2) 332 patients with CH were detected, and the incidence was 37.5 per 100 000 (1:2667) with frequency of transient forms of 20.8%. This increase in number of transient CH in period 2 compared to period 1 was statistically highly significant ($p<0.01$) (Figure 2).

Prevalence of transient CH was significantly higher in male (24.2%) than in female newborns (13.7%) with CH ($p<0.01$).

Scintigraphy performed in 306 newborns with permanent CH was as followed: thyroid dysgenesis occurred in 73.2% (agenetic 23.2%, ectopic lingual 49.0%, hypoplastic and hemiagenetic 1.0%), an enlarged thyroid was seen in 22.9% and a normal-sized eutopic gland in 3.9%.

The median age at onset of thyroxine (L-T₄) replacement therapy was 18.7 ± 10.5 days of life and the median initial L-T₄ dose was 13.5 ± 2.5 µg/kg/day.

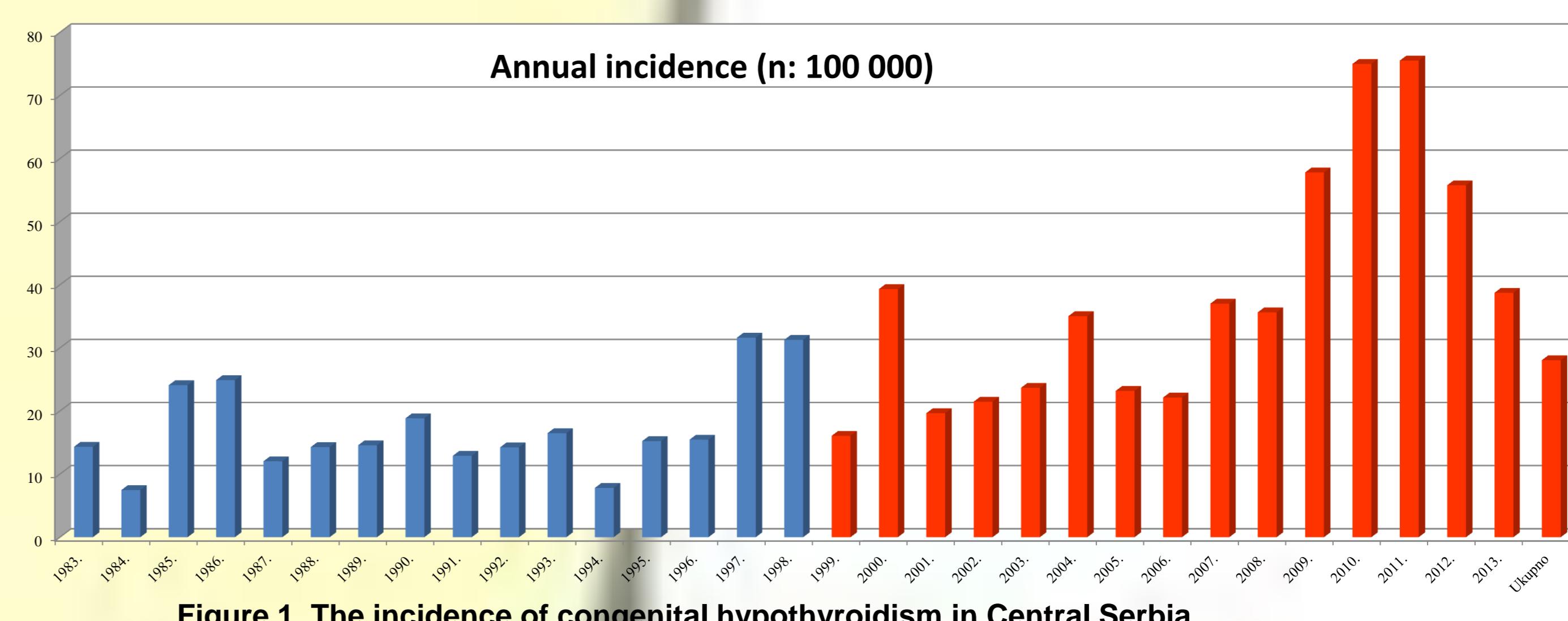


Figure 1. The incidence of congenital hypothyroidism in Central Serbia

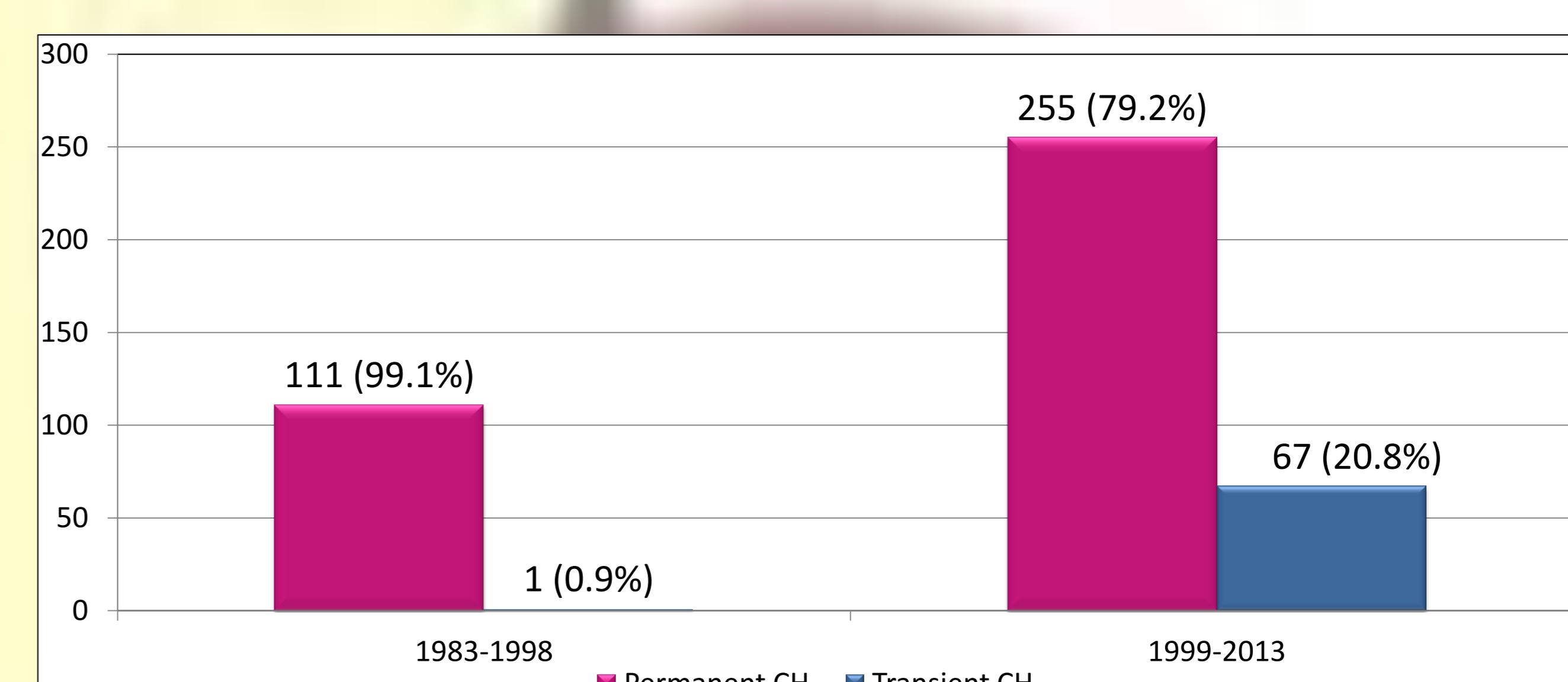


Figure 2. Increased incidence of both permanent and transient CH

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