Laboratory analysis in the diagnosis of anemia in general practice

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CONCLUSION

An extensive laboratory work-up in patients with newly diagnosed anemia is more effective in finding the underlying etiology than a routine laboratory work-up selected by general practitioners. Further studies should focus on an extensive laboratory work-up and the added value of multidisciplinary diagnostic approaches in patients with anemia in general practice.

BACKGROUND

- Anemia is a common finding in patients aged 65 years and older in general practice.
- Anemia is a symptom of an underlying disease and the most common underlying causes in general practice are iron deficiency anemia (IDA), anemia of chronic disease (ACD) and renal anemia.
- A considerable proportion of anemia cases have no clear cause and are classified as unknown anemia.
- **Aim study:** We used an online survey among general practitioners to establish whether a routine or extensive laboratory approach is more effective in diagnosing the underlying cause of anemia in general practice.

METHODS

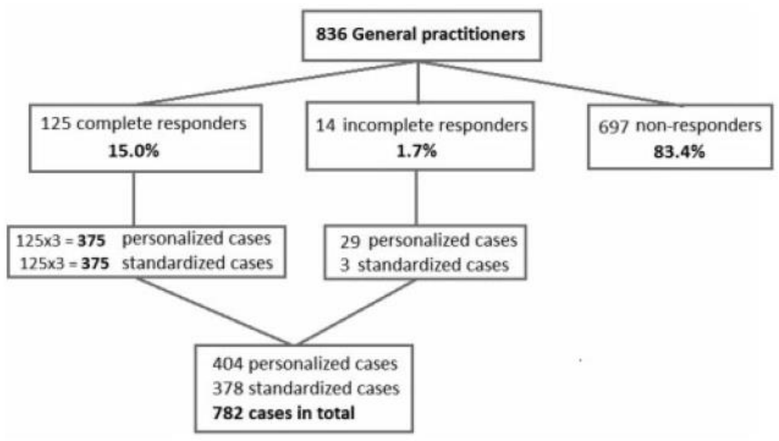

Figure 1. A flow diagram showing the general practitioners who responded to the survey.

The 6 cases used in the survey were randomly selected from a large database of anemia patients. For the first 3 cases, respondents were asked to choose the laboratory tests they considered necessary from the predefined list of 14 parameters → **routine work-up**. For the second set of 3 cases, respondents were presented with the results of all 14 tests, and they did not have the ability to request additional tests → **extensive work-up**.

RESULTS 1

Table 3. Diagnosis of underlying cause of anaemia using a routine or extensive work-up.

	Diagnosis expert panel			
Diagnosis GP	IDA	ACD	Renal anaemia	Other (including unknown)
Routine				
IDA	**45 (69.2)**	13 (10.3)	2 (3.8)	14 (8.8)
ACD	5 (7.7)	**56 (44.4)**	17 (32.1)	51 (31.9)
Renal anaemia	0 (0)	4 (3.2)	**28 (52.8)**	10 (6.3)
Other (including unknown)	15 (23.1)	53 (42.1)	6 (11.3)	**85 (53.1)**
Total	**65**	**126**	**53**	**160**
Extensive				
IDA	**47 (70.1)**	19 (14.4)	0 (0)	11 (8.3)
ACD	6 (9.0)	**72 (54.5)**	10 (21.7)	28 (21.1)
Renal anaemia	4 (6.0)	8 (6.1)	**30 (65.2)**	9 (6.8)
Other (including unknown)	10 (14.9)	33 (25.0)	6 (13.0)	**85 (63.9)**
Total	**67**	**132**	**46**	**133**

Note: The diagnosis set by the GPs is showed against the diagnosis set by the expert panel for both routine and extensive work-up. The bold values are the correct diagnoses.
GP: general practitioner; ACD: anaemia of chronic disease; IDA: iron deficiency anaemia.

RESULTS 2

Table 4. Multivariate analysis of the efficacy of extensive versus routine laboratory work-up.

	Odds ratio (95% CI)	*P*
Extensive work-up	1.56 (1.12–2.17)	0.007
Age of patient		
• 50–64 Years	Reference category	
• 65–74 Years	0.48 (0.25–0.90)	0.022
• 75–84 Years	0.45 (0.25–0.83)	0.010
• 85+ Years	0.47 (0.25–0.83)	0.016
Gender of patient (female)	1.28 (0.83–1.97)	0.258
Underlying cause		
• IDA	Reference category	
• ACD	0.37 (0.19–0.72)	0.003
• Renal anaemia	0.69 (0.31–1.56)	0.376
• Other incl. unknown	0.58 (0.31–1.10)	0.097

Note: Multivariate analysis using a generalized linear mixed model showed a significant influence of the laboratory work-up, age of patient and the underlying cause of anaemia itself on the correct diagnosis of the underlying cause of anaemia.

DISCUSSION

- The percentage of correct diagnoses increased from 53.0% when using a routine work-up to 61.9% when using an extensive work-up.
- Annually 57,000 patients aged 55 years present with a new anemia in Dutch general practice. The absolute difference of almost 9% will benefit approximately 5,130 patients.
- Patient characteristics (aged 65 years and older) and the underlying cause itself negatively affect the probability of a correct diagnosis independently from the laboratory work-up.

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