Dynamic changes of faecal haemoglobin to assess the risk of advanced colorectal lesions

Josep Maria Auge

on behalf PROCOLON Group

Possible conflicts of interest

- Nothing to disclose

Introduction

- **The mutant nature of blood in faeces**
  - Complex matrix (Bristol Stool Form Scale)
  - Heterogeneous distribution
  - Intermittent bleeding
  - Complex preanalytical phase
  - Discrepant results between intestinal movements
    - Ranging 7.1% - 12.4% depending on the cut-off *

* Auge et al. Clin Chem Lab Med. 2018 Mar 28;56(4):625-633.

Aims

- **Evaluate in FIT negative participants (<20 µgHb/g faeces), the dynamic changes and cumulative effect of fHb during the first and second rounds to asses the risk of advanced colorectal lesions (ACRL) at the third round.**

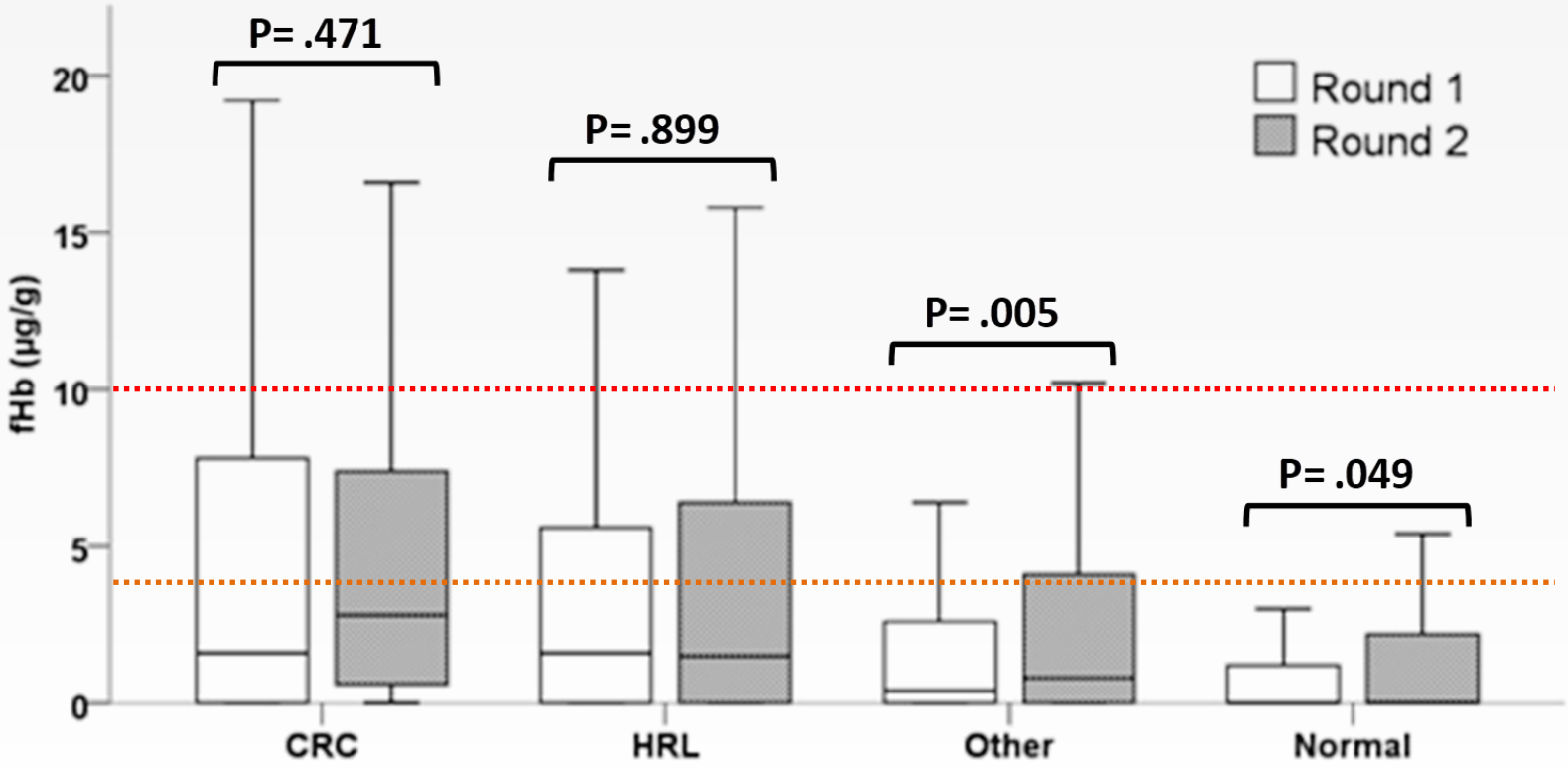
- **Propose a method to select those individuals at highest risk of advanced colorectal lesions (ACRL).**

Methods

- 1771 average-risk participants (50-69 years old) from the Barcelona CRC screening programme.
- All participants were FIT negative in round 1 and 2, with a colonoscopy examination as a result of FIT positive in the third round.
- ACRL was defined as colorectal cancer (CRC) and/or high risk lesions (HRL) including ≥ 5 adenoma /serrated lesions and/or lesion size ≥20 mm.
- Samples were analysed using OC-SENSOR DIANA (Eiken Chemical Co).

Results

- Colonoscopy findings according to first and second round fHb concentration



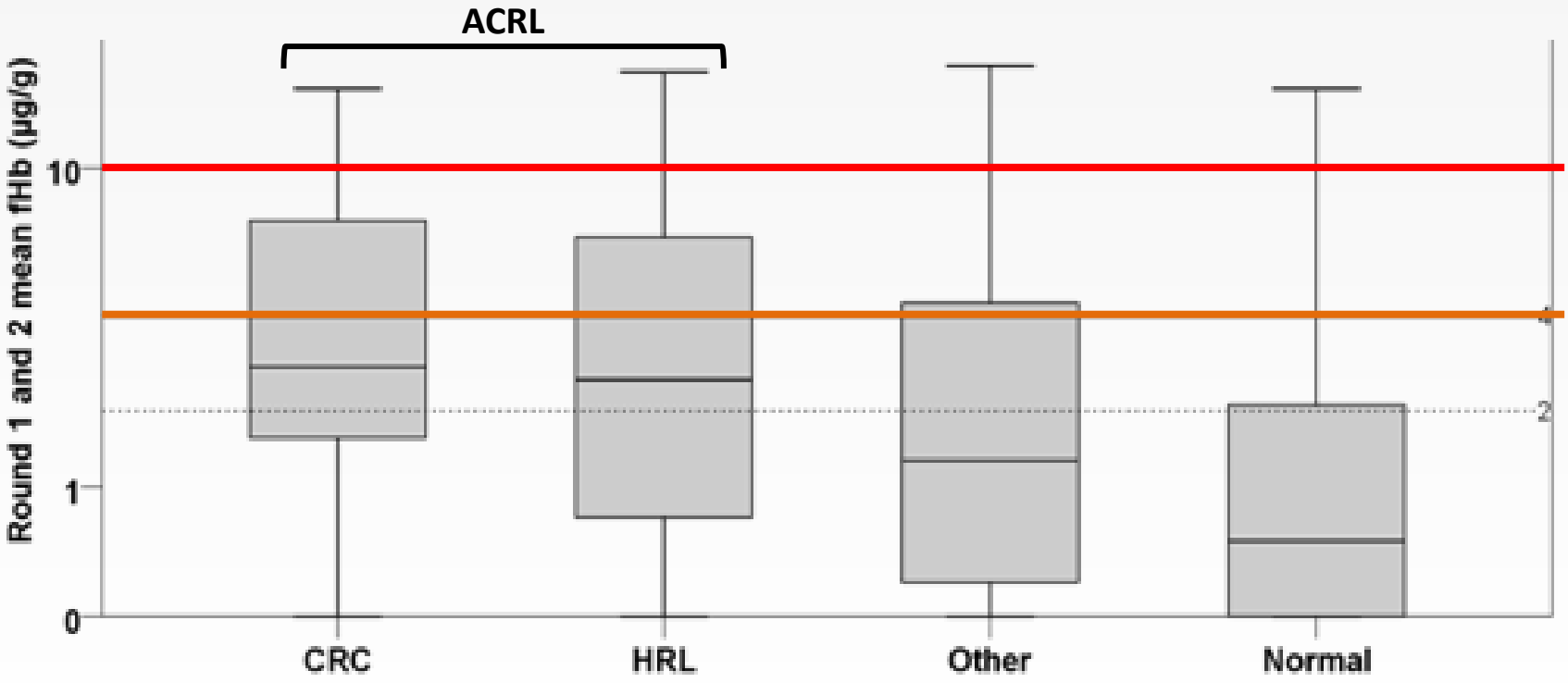
Results

- **FIT-negative fHb levels categories**
  - **Below lower detection limit (< 4 µg/g)**
  - **Physiological established fHb levels (4 – 10 µg/g)**
  - **Near positive fHb levels (11 – 19 µg/g).**

Dynamic changes (% lesions in each group)	**ACRL n=275**	**Total**
Low stable level (<4 µg/g)	133 **(11.7%)**	1138
Intermediate stable level (4-10 µg/g)	15 **(40.5%)**	37
High stable level (11-19 µg/g)	8 **(33.3%)**	24
One step increase	34 (16.5%)	206
Two steps increase	28 (22.4%)	125
One step decrease	36 (23.7%)	152
Two steps decrease	21 (23.6%)	89

Results

- Colonoscopy findings according to first and second round mean fHb concentration



Results

- Distribution of lesions related to gender and mean fHb concentration

			CRC		HRL		Other		Normal	
Round 1 and 2 mean fHb (µg/g)			n	% fHb group	n	% fHb group	n	% fHb group	n	% fHb group
<4	Men	35,8%	15	2,4%	84	13,2%	351	55,4%	184	29,0%
	Women	39,5%	11	1,6% ↓	54	7,7% ↓	307	43,9%	328	46,9% ↑
4-10	Men	11,3%	10	5,0%	41	20,4%	120	59,7%	30	14,9%
	Women	9,2%	8	4,9%	27	16,6%	85	52,1%	43	26,4%
11-19	Men	2,6%	4	8,7% ↑	16	34,8% ↑	23	50,0%	3	6,5% ↓
	Women	1,5%	1	3,7%	4	14,8%	17	63,0%	5	18,5%

Results

- **Risk of ACRL according to sex and mean fHb.**

	Women	Men
<4 µg/g	**1 (700)**	**1.81 [1.30-2.52] P = .001 (634)**
4-10 µg/g	**2.67 [1.70-4.20] P < .001 (163)**	**3.32 [2.21-4.99] P = <.001 (201)**
11-19 µg/g	**2.22 [.81-6.06] P = .119 (27)**	**7.51 [3.98-14.20] P = <.001 (46)**

Odds ratios [95% confidence interval].
The number of individuals is shown in parentheses.

Results

- **Likelihood for ACRL according to sex and mean fHb.**

	Women		Men	
<4 µg/g	9.3%	(98.4%)	15.6%	(97.6%)
4-10 µg/g	21.5%		25.4%	
11-19 µg/g	18.5%		43.5%	

Probability for rolling out CRC is shown in parentheses.

Conclusions

- Dynamic changes in fHb concentration in previous rounds (increments or decrements) are not related to the severity of lesions in subsequent rounds.
- Cumulative fHb levels in previous rounds are related to the lesions detected in third round FIT positive participants.
- Mean fHb in previous rounds in addition to gender is a good method to asses the risk of advanced colorectal lesions but not an effective method to rule out this kind of lesions.
- Mutant nature of fHb has less effect than suspected.
- A limitation of this study is that only were included third round FIT positive participants.