LONG NON-CODING RNA AS A POTENTIAL DIAGNOSTIC TOOL IN CORONARY ARTERY DISEASES - A SYSTEMATIC REVIEW

Anandhi Sekar Arthisri ; Vishnupriya Veeraraghavan

INTRODUCTION

- Coronary Artery Disease (CAD) is a leading cause of mortality and morbidity worldwide.
- The long noncoding RNAs (lncRNAs) i.e. those with lengths ranging from 200 nucleotides to over 10,000 nucleotides have been found to be engaged in certain biological and pathological events through epigenetic modification, cell signalling, transcriptional, or post-transcriptional regulatory mechanisms.
- LncRNAs have emerged as potential biomarkers for CAD, offering insights into the genetic basis of the disease.

AIM

To evaluate the diagnostic accuracy of specific lncRNAs in identifying CAD and to identify promising biomarkers for CAD diagnosis.

MATERIALS AND METHODS

Prospero ID- CRD42023466700

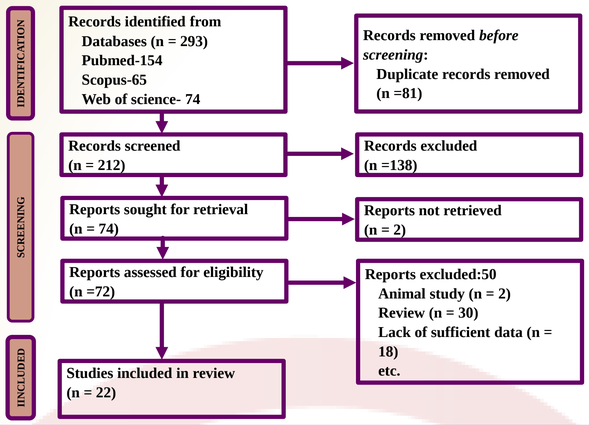
Databases: Pubmed, Scopus, Web of science

Key words: "Coronary artery diseases OR CAD OR coronary heart disease" AND "Long non-coding RNA OR lncRNA OR long intergenic non-coding RNA" AND Biomarkers OR Marker"

South Jordan campus

MATERIALS AND METHODS

Figure 1 Prisma flow chart search strategy



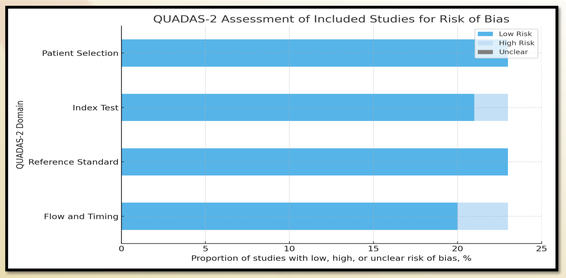
Inclusion Criteria:

- Studies published in English, human studies involving participants diagnosed with CAD or healthy controls.
- Studies reporting sensitivity, specificity, and other relevant diagnostic parameters or providing enough data to calculate them and original research articles

Exclusion Criteria:

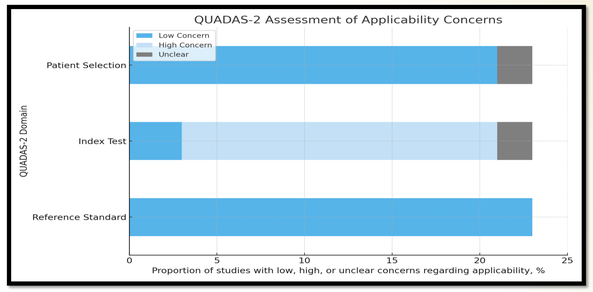
- Animal or in vitro studies, lacking full-text availability, duplicate publications or overlapping datasets, letter to the editor, review or meta – analysis.

Assessment of Included Studies for Risk of Bias: QUADAS 2:



MATERIALS AND METHODS

Assessment of Applicability Concerns



RESULTS

S.NO	AUTHOR	YEAR	SAMPLE SIZE	SPECIMEN	METHOD	STUDY DESIGN	LNRNA	STATE	TP	FN	FP	TN	SENSITIVITY SPECIFICITY
1	Yujia Yang	2015	221(187)	Plasma, extracellular vesicles	qPCR	Case control study	COROMARKER, AC100865.1	Up	25	16	6	31	60.98 83.78
2	Yue Cai	2016	50(50)	Plasma, PMBC	q RT-PCR	Case control study	OTTHUMT00000387022	Up	40	10	1	49	80 98
3	Mingjiao Zhang	2016	30(102)	Serum	q RT-PCR	Case control study	uc022bqs.1	Up	91	11	7	23	89 76.7
4	Qiong Yin	2017	30(30)	Plasma	q RT-PCR	Case control study	GAS 5	Down	28	2	2	28	95 95
5	Jialong Zhu,	2017	28(28)	Plasma &heart tissue	q RT-PCR	Case control study	NOVLNC6	Down	25	3	3	25	90 90
6	Sara Bitarafan	2019	50(50)	Blood	qPCR	Case-control study	H19	Up	28	22	22	28	56 44
7	Xuejie Li	2017	137(115)	Blood	Qpcr	COHORT	ENST00000512246.1 (referred to as Upperhand	Up	101	36	40	75	73.7 65.2
8	Lin Li	2018	412(295)	PMBC	q RT-PCR	Observational	ENST00000444488.1 and uc010yfd.1	Up	354	152	69	274	70 80
9	Jiao Huang	2019	550(550)	Blood	q RT-PCR	Case control	H19	Up	477	73	45	505	86.7 91.8
10	Ping Li	2020	187(150)	Blood	q RT-PCR	Observational cross sectional	ENST00000416361.	Up	148	39	12	138	79.02
11	Teodora Barbalata	2023	23(33)	Plasma	TAQMAN PCR	Observational cross sectional	LIPCAR and MALAT1	Up	26	7	2	21	80 90
12	Fanqin Lv,	2021	149(90)	Plasma	q RT-PCR	Observational cohort study	MALAT	Up	112	28	9	81	80 90
13	Chao Liu	2021	30(30)	Blood and pmbc	q RT-PCR	Cohort	AC010082.1 and AC011443.1	Up	19	11	12	18	63.3 60
14	Xiong	2019	30(30)	Serum	q RT-PCR	Case-control	H19	Up	28	2	28	2	93.67 93.67
15	Hamide Saygili	2021	45(45)	Blood	q RT-PCR	Case-control	MEG3 MIAT	Up Down	28 31	17 14	17 14	28 31	62.2 62.2 68.9 68.9
16	Yuan Zhang	2019	30(24)	Blood	q RT-PCR	Case-control	KCNQ1OT1, HIF1A-AS2 and APOA1-AS	Up	30 17 30	0 13 0	10 0 5	14 24 19	100 60 55 100 100 80
17	Caihong Liang	2020	111(68)	Plasma	q RT-PCR	Cohort	Exosomal SOCS2-AS1	Down	79	32	25	43	71.4 63.4
18	Yue Cai	2016	211(171)	PBMC	q RT-PCR	Cohort	LncPPARδ"	Up	116	95	34	137	55 80
19	Zhen Zhang	2017	300(180)	Plasma	q RT-PCR	Observational cross sectional	H19 & LIPCAR	Up	161 217	139 83	49 68	131 112	53.6 73 72.2 62.3
20	Meili Zheng	2023	100(48)	Plasma	q RT-PCR	Case-control	Exosomal lncRNA ENST00000424615.2 and ENST00000560769.1	Up	65 72	35 28	17 13	31 35	65 64.58 72 72.92
21	Shu He	2023	270(47)	PBMC	q RT-PCR	Case-control	PDXDC1-AS1 and SFI1-AS1	Up	183	87	15	32	67.78 68.09
22	Niloofar Avazpour	2018	20(20)	PBMC	q RT-PCR	Case-control	HOTAIR	Up	19	1	3	17	95 85

RESULTS

- The systematic review encompasses 22 studies, collectively analyzing a total of 5301 patients.
- The studies collectively reported the regulation of numerous lncRNAs, with a total of 23 lncRNAs observed to be upregulated and 4 lncRNAs found to be downregulated.
- Sensitivity across studies ranged from 56% to 95%, while specificity varied between 44% and 98%, illustrating the diverse diagnostic potential of lncRNAs
- For H19, sensitivity and specificity varied across studies, with one study showing 56% sensitivity and 44% specificity, while another reported 86.7% sensitivity and 91.8% specificity. indicating the need for cautious interpretation of individual lncRNA performance.

CONCLUSION

- The identification of 19 upregulated and 4 downregulated lncRNAs across over 5000 patients provides valuable insights into their potential as biomarkers and therapeutic targets,
- The variations indicates the need for standardized methodological approaches in lncRNA research to fully harness their diagnostic and therapeutic potential.

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