

INTRODUCTION

The benefits of cardiac imaging are well documented and modern medicine indisputably requires the use of such versatile and useful techniques^[1]. However, advances in medical imaging and procedural technology utilising radiation, have resulted in an increase in radiation exposure to cardiovascular patients^[2]. Therefore it is of vital importance that consent be sought from patients after they have been informed about the relevant radiation risks.¹ Furthermore, it is imperative that these risks are described in a universally harmonised way, understood by all practitioners so as to maintain the most efficient and accurate benefit/risk communication system with patients internationally.³

AIMS

This study aimed to provide an insight into the Cardiologist's opinion on including detail of radiation risks as part of routine patient consent process for cardiac imaging procedures, in two cardiac centres of excellence and to investigate their knowledge of radiation dose associated to interventional cardiology procedures.

METHODOLOGY

The research involved cardiology clinicians completing a 7 page questionnaire comprising of 28 questions. An institutional ethics waiver was confirmed for the research.

The researcher attended both adult and paediatric cardiovascular (CV) imaging suites in Dublin, Ireland and Milan, Italy. The clinical placement facilitated an observership and the attending CV clinicians were requested to participate in a survey which focussed upon the communication of radiation risks to paediatric patient carers and adult patients undergoing cardiac interventional procedures.

All questionnaires were delivered by hand after obtaining approval from the CV department managers for the researcher to undertake the study. The questionnaire design was developed for this study from a larger Radiology focussed PhD study currently investigating the risk/benefit consent/communication process across Diagnostic Imaging modalities, in a UCD/University of Malta collaboration. All participants had the right to decline participation

RESULTS AND DISCUSSION

DEMOGRAPHICS

18 cardiac practitioners participated (female n=3; male: n=15)

56% identified as Consultants, 33% identified as Senior Registrars. The remaining participants identified as a cardiologist trainee and one fellow. A wide range of procedures were performed monthly across the cardiology participants (figure 1), 67% stating adult only clinical commitment.

All the participants stated they had received radiation safety training, on average the total number of hours of radiation safety training received was 39 hours, varying with the number of years since training received. Training occurring "less than a year ago" (33%), while 17% stated "more than 10 years ago". The type of training received was also varied as seen on figure 2. Furthermore, 50% of the participants stated that they had not received any training in benefit/risk communication.

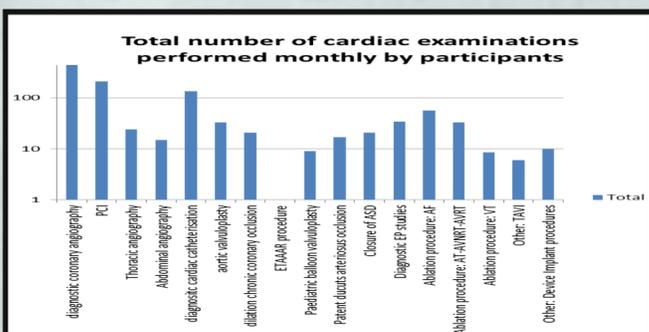


Figure 1. Summary of the number of cardiac examinations performed monthly by participants.

CONSENT DATA

High compliance in the use of internationally recognised guidelines amongst the participants (72%) was identified. Participants stating that they would consider previous procedures undertaken on the patients before requesting or performing CV examinations. The majority of participants (94%) agreed that parents should be informed of potential risks of paediatric examination and that adult patients should be informed when attending for examination.

Over 60% of participants stated the medical doctor referring the patient should inform parents of procedural risks/benefits. According to participants, there was an increased percentage of concern about risks shown by parents of paediatric patients (39%) compared to adults (33%). While a similar percentage of participants encountered refusal of performing a procedure from paediatric and adult patients (25%, 22% respectively).

According to participants, there was an increased percentage of concern about risk and benefits of the cardiac examination performed on children. Participants stated similarly for adult patients (89%). Although one participant commented that providing information regarding only benefits pertaining to cardiac imaging examinations, in both adult and paediatric scenarios, was relevant. Communicating radiation risk to children and their parents is a challenge that has to be faced so as to obtain valid and informed consent⁵. Furthermore adult patients are becoming more actively involved in their own treatment indicating that patients will need to be involved to a higher degree in terms of consent and communication⁴. 75% of participants confirmed that consent should always be sought from parents when a medical examination is to be performed on their child with 75% of them indicating that they checked for both, written and verbal consent. Similar percentages were noted for adult patient.

Figure 2. Summary of the types of training received by participants.

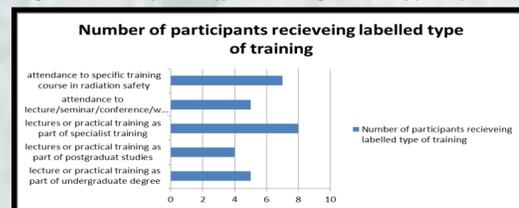


Figure 3a

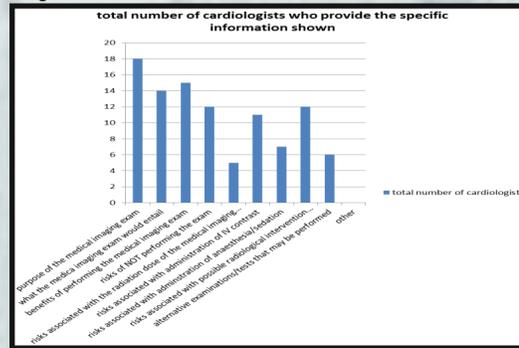


Figure 3b

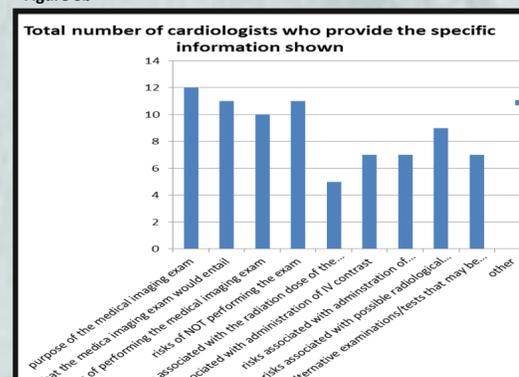


Figure 3a (paediatric) and 3b (adult). The total number of cardiologists who provided specific risk/benefit information to patients prior to performing the procedures.

CONFIDENCE

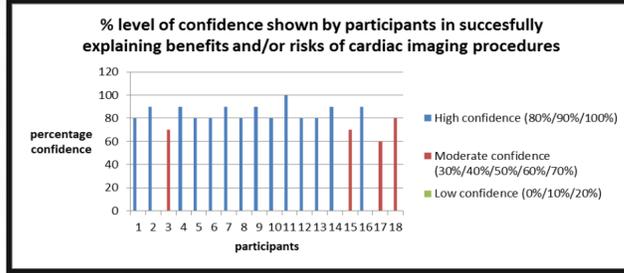


Figure 4. Level of confidence indicated: radiation risk/benefit communication.

CV Procedure	Effective dose (mSv) Range in parenthesis	% participant who marked the right answer
RF ABLATION- AF	16.6 (6.6-59.2)	17
MRI Abdo (paediatric)	0	61
Paediatric Balloon Valvuloplasty	8.1 (2.9-20)	11
Closure of ASD	2.8 (1.8-7.4)	61
Dilation Chronic Coronary Occlusion	81 (17-194)	44
ETAAAR procedure	76-119	11
Ultrasound (paediatric)	0	67

Table 1. Outlines the percentage of participants who marked the correct answer when asked to estimate effective dose (mSv) for a number of different cardiac imaging procedures. [Figures based on Picano and Vano 2014 study from the European Heart Journal^[1]].

Less than 50% of the participants marked the correct effective dose range for a number of the procedures commonly undertaken, despite indicating high confidence level at explaining risk/benefit of cardiac imaging procedures to their patients¹. In all cases effective dose levels were under estimated. A number of responses indicated dose levels for MRI and US which are non-ionising procedures, this is however similar to previous radiation knowledge based studies^[6]. Ablation procedures which record patient dose levels of 16—59 mSv¹ and which were commonly performed by participants (Figure 1) recorded the greatest underestimation of dose.



Figure 5: Only 56% of participants answered all 5 True/False statements correct-

CONCLUSIONS

The importance of accurate risk benefit communication pertaining to cardiac imaging examinations for both adult and paediatric patients was identified by the cardiologists. All cardiologists were familiar with international guidelines of good practice for examination referral. 50% of participants stated no risk/benefit communication training whilst international papers indicate the need for this to be actioned and harmonised across Europe. An under estimation of dose levels was identified in the findings which contradicted the cardiology confidence ratings.

RECOMMENDATIONS

The formulation and dissemination of agreed effective dose ranges for the purpose of accurate risk/benefit communication for cardiac imaging to patients is recommended.

Greater provision of training in risk /benefit communication, to include radiation risk, for those involved in patient consent in a harmonised structure as promoted in current EU papers.

REFERENCES

- [1] E. Picano; E. Vano, et al., The appropriate and justified use of medical radiation in cardiovascular imaging: a position document of the ESC Associations of Cardiovascular Imaging, Percutaneous Cardiovascular Interventions and Electrophysiology, *European Heart Journal* (2014) 35, 665–672
- [2] P. S. Douglas, et al., Developing an Action Plan for Patient Radiation Safety in Adult Cardio-



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