

US2013/0109966 describes systems for optimizing the image quality of a scan over a prolonged period of time.

## SUMMARY OF THE INVENTION

5 | It is the object ~~Embodiments~~ of the present application to provide methods for determining the optimal volume of contrast medium to be administered to a patient prior to administration. In particular embodiments, the methods envisaged herein have the advantage that they ensure that enough contrast medium will be administered to provide an accurate diagnosis while the number of adverse reactions that said contrast medium causes  
10 | to a patient is reduced.

According to a first aspect of the present invention, there is provided a controller for a device for administering contrast medium comprising radio contrast agent into a patient using an injector, said device or controller comprising: Input means allowing input of one or more patient-specific physiological parameters, said one or more patient-specific physiological  
15 | parameters comprising at least the patient's heart rate, length and weight; a processor configured to calculate the optimal volume of contrast medium based on said one or more patient-specific physiological parameters; and a connection to the injector configured to control the volume of contrast medium to be injected into the patient prior to administration, based on said optimal volume calculated by said processor; wherein the controller is  
20 | configured to use the length and weight of the patient to determine the Body Surface Area (BSA) of the patient and said optimal volume of contrast medium is calculated based both on the BSA and the heart rate of said patient; and wherein the calculation of said optimal volume of contrast medium comprises starting from an initial volume of contrast medium and adjusting said volume based on said patient-specific parameters.

25 | According to a second aspect of the present invention, there is provided a method for determining the optimal volume of contrast medium comprising radio contrast agent to be administered to a patient prior to administration, comprising the steps of: determining one or more patient-specific physiological parameters, said one or more patient-specific  
30 | physiological parameters comprising at least the patient's heart rate, length and weight, wherein the length and weight of the patient are used to determine the Body Surface Area (BSA) of the patient and said optimal volume of contrast medium is calculated based both on the BSA and the heart rate of said patient; calculating the optimal volume of contrast medium based on said patient-specific physiological parameters; and adjusting the volume

of contrast medium to be administered to said patient to correspond with said optimal volume of contrast medium, wherein the calculation of said optimal volume of contrast medium comprises starting from an initial volume of contrast medium and adjusting said volume based on said patient-specific physiological parameters.

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It has been established that the optimal volume of contrast medium to be administered can be established based on patient-specific physiological parameters, and most particularly, based on the patient's heart rate. Accordingly, the application provides methods for determining the optimal volume of contrast medium to be administered to a patient based on the patient's heart rate. In particular embodiments, the methods comprise the steps of: determining one or more patient-specific physiological parameters, said one or more patient-specific physiological parameters comprising at least the patient's heart rate and calculating the optimal volume of contrast medium based on said one or more patient-specific physiological parameters. In particular embodiments, the methods envisage determining the heart rate and one or more additional physiological parameters of the patient. In particular embodiments of the methods envisaged herein, the additional patient-specific physiological parameters include length and weight of the patient. In further particular embodiments, the length and weight of the patient are used to determine the Body Surface Area (BSA) of the patient, and both the BSA and the heart rate of the patient are used to determine the optimal volume of contrast medium. Additionally or alternatively, the patient-specific parameters can include age, gender, estimated glomerular filtration rate (eGFR) and cardiac output (CO). Additionally or alternatively, the calculation of the optimal volume of contrast medium further comprises taking into account one or more non-patient specific parameters, such as scanner type and/or tube voltage of the scanner to be used for imaging.

In particular embodiments, the optimal volume of contrast medium is determined starting from an initial volume of contrast medium, which is further adjusted based on said one or more patient-specific physiological parameters. In further particular embodiments the method comprises: measuring one or more patient-specific physiological parameters, said one or more patient-specific physiological parameters comprising at least the patient's heart rate; calculating an initial volume of contrast medium, and; adjusting the initial volume of

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