

Coronary Computed Tomography Angiogram (CTA)

Computed Tomography, commonly known as a CT scan, gives a cross-sectional view of the body through a computer-aided process that combines multiple X-ray images. CTA can generate high-definition, three-dimensional images of the heart and heart vessels to detect if either fatty deposit or plaque (calcium deposit) has built up in the lumen (coronary arteries).



Indications

CTA is prescribed by the doctor to assess the condition of a patient's coronary arteries.

Getting high definition coronary angiogram images

To obtain high quality scan images, *beta blockers* (to slow down the heart beat) or *nitrolingual sprays* (to dilate the coronary arteries) may be used. These medications may cause symptoms of shortness of breath, bradycardia (slow heart rate), dizziness, or headache.

A *contrast medium*, or contrast dye, which highlights the area scanned, will also be used and injected into the patient. (See below)

During the scanning process, the patient will also be asked to control breathing, for example, take a deep breath and hold.

Special points to note before coming for the CTA

In view of the use of some of the above medical substances, the patient must inform the doctor ahead of time if the following symptoms or conditions are present to ensure a safe process:

- Asthma or other respiratory disease
- Food or drug allergy
- History of severe peripheral vascular disease
- Currently pregnant or lactating
- Prevaling condition of low blood pressure (SBP<90mmHg)
- Suffering from unstable angina, and being treated with medications
- For male patients: having taken drugs to treat erectile dysfunction in the previous few days (as these drugs may counteract the nitrolingual spray)
- Suffering from other cardiac abnormalities, such as bradycardia, or heart block

The patient must stop taking tea, coffee, coke or other drinks containing caffeine **12 hours** before, and begin a fast **four hours** prior to, the scheduled appointment (**except for medications**, which should be taken with a little bit of clear water). Patients with **diabetes mellitus** should continue to follow their doctor's instruction on medications.

How is a CTA performed?

During the preparatory stage, the nurse will check the patient's heart rate to ensure it has a regular rhythm, and is within the normal range of around 65 beats per minute.

The nurse will also insert a fine cannula (plastic tube) into the patient's forearm through which the contrast medium will be injected.

Once on the CT bed table, the nurse will attach electrocardiogram (ECG) leads to the patient's chest to monitor the heartbeat. The nurse will also give breathing advice.

The final preparation involves the radiologist injecting the patient intravenously with contrast dye. (Please refer to a separate patient information leaflet on *Notes on the use of intravenous (IV) contrast medium for CT scan*)

The nurse and the radiologist will continue to observe the scanning process and monitor the patient's condition at the control panel just outside the room.

The scanning process generally takes around 15 minutes to complete.

When scanning is complete

Once scanning finishes, the nurse will check the patient's condition and the injection site, and will remove the cannula if all the captured images are satisfactory.

No significant recovery time from this procedure is necessary. If the patient appears well, with no sign of allergic reaction to the contrast dye, the patient can leave, and resume normal activities, including eating and drinking.

Possible risks or complications of a CTA

Minor reaction

There have been reports of rash, itchiness, or alteration in blood pressure, which occasionally occurs and is temporary. These may not be life threatening but do require medical consultation.

Major reaction

Allergic reaction to the intravenous contrast medium has been reported. Nonetheless, the risk is very small, with less than one chance in every 100,000 injections. The hospital is fully equipped to control the situation. It must be pointed out that there is still a rare possibility of mortality from an extremely severe reaction.

Leakage

Leakage of the contrast dye from the vein to the surrounding tissues at the injection site can sometimes occur, causing complications. These include severe skin reaction, which may last for quite a while, or thrombosis of the vein, which will gradually subside by itself.

Interpretation of results

CTA is a non-invasive method of obtaining images of the coronary arteries. The calculated degree of narrowing of the coronary arteries is an excellent estimation of the status of the coronary arteries, but is less accurate than the measurements taken by an invasive Coronary Catheterised Angiogram (CCA). As such, the cardiologist will perform a diagnostic catheter angiogram, if and when necessary, before prescribing treatment.

In conclusion, a completely normal finding from a CTA is a reassuring indicator that there is no significant abnormality in the coronary arteries. Meanwhile, a "positive" result should be regarded as a precursor to further therapy, and not the end result.



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冠狀動脈電腦掃描造影 (CTA)

電腦掃描，通常稱為CT掃描，是透過以電腦及多重X光影像來展示身體各部分的橫切影像。這些高解像度的3D心臟和心血管影像有助檢測血管腔（冠狀動脈）內是否有積聚脂肪或鈣化物。



測試目的

CTA 能夠協助醫生評估病人的冠狀動脈的狀況。

冠狀動脈血管高清影像

為了拍攝出高質素的掃描影像，檢查時，醫生或會使用一些藥物如 Beta 阻斷劑（用作減慢心跳）或硝酸甘油噴霧劑（用作擴張冠狀動脈）。這些藥物可能會導致呼吸急促、心跳減慢、頭暈或頭痛。

另外，病人或會注入顯影劑，以突顯所掃描的部位。（見下文）

掃描過程中，病人須控制呼吸，例如深呼吸及短暫閉氣。

接受CTA檢查前須注意的事項

由於 CTA 檢查時會使用一些顯影劑，為了確保掃描能安全進行，病人若有以下任何疾病或症狀，必須在檢查前通知醫生：

- 哮喘或其他呼吸道疾病
- 食物或藥物過敏
- 曾經患上嚴重血管疾病
- 現正懷孕或進行母乳餵哺
- 長期低血壓 (SBP <90mmHg)
- 患有不穩定心絞痛，並正在服用藥物
- 男性病人：過去幾天曾服用治療勃起功能障礙的藥物，因為這些藥物可能抵消硝酸甘油噴霧劑的功效
- 患有其他心臟異常的疾病，如心跳過慢或心傳導阻滯等

此外，病人必須在檢查前12小時避免飲用茶、咖啡、可樂或其他含咖啡因的飲料，並且在檢查前四個小時開始禁食（用少量清水服藥除外）。糖尿病患者應繼續遵循醫生的服藥指引。

如何進行CTA檢查？

準備檢查時，護士會檢查病人的心跳是否屬於正常水平，即每分鐘約 65 次。

護士還會在病人的前臂插入幼小的導管，以便注射顯影劑。

當病人躺在檢查的床上，護士會將心電圖 (ECG) 的導線連接到病人的胸口位置，以監測其心跳是否正常，並指導病人控制呼吸。

最後的準備工作是由放射科醫生將顯影劑注入病人的靜脈內。（請參考另一張病人資訊單張，名為《進行電腦掃描時使用靜脈注射 (IV) 顯影劑之注意事項》）。

護士及放射科醫生會在房外的控制台持續觀察掃描過程，並監控病人的狀況。

掃描過程通常需時約 15 分鐘。

掃描完成後

當掃描完成後，護士會檢查病人的狀況和注射顯影劑位置。若掃描所得的影像效果良好，便會移除導管。

一般而言，病人檢查後不需要等待復原才活動。如果病人狀況良好，亦沒有對顯影劑出現過敏反應，便可以離開及恢復正常活動，包括進食和飲水。

CTA 的潛在風險或併發症

輕微反應

部分病人會出現風疹、感到痕癢、血壓改變，但只是偶爾發生而且是暫時性，雖然未必對生命有危險，但應求症治理。

嚴重反應

部分病人會對靜脈注射的顯影劑產生過敏反應，但該風險非常小，每 100,000 次注射只有少於一次機會。醫院設備齊全，可對應相關情況，但必須指出的是，這是極嚴重的過敏反應只有很少的機會導致死亡。

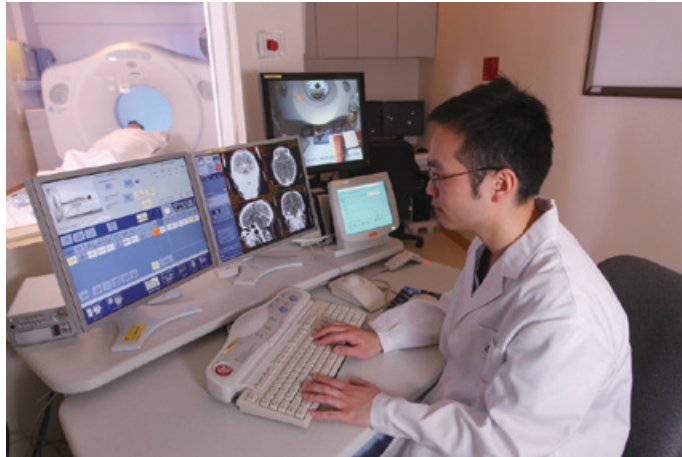
顯影劑滲漏

注射顯影劑時，在注射部位有可能會出現顯影劑外滲至周邊組織的情況，引發一些併發症，當中包括持續相當長時間的嚴重皮膚過敏反應，或靜脈栓塞（但會自行逐漸消退的）。

解說檢查結果

CTA 是一個非侵入性的冠狀動脈造影方法，能顯示冠狀動脈收窄的程度，從而推測冠狀動脈的狀況，惟準確度未及傳統侵入性較高的冠狀動脈導管造影（CCA）。因此，如有需要，心臟科醫生須於治療前為病人進行傳統的導管造影術以便確診。

總括來說，如 CTA 驗出的結果正常，病人可安心，這顯示冠狀動脈中沒有明顯異常的情況。然而，若檢查結果有異常（即 Positive），亦應視為須進一步檢驗治療的指標，而非最終結果。



撰寫：

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