Diagnostics

A new full body low-dose x-ray technique is an alternative to conventional “shunt series” in patients with ventriculoperitoneal shunt dysfunction

Benoit B. Schaller MDa,*, Aristomenis K. Exadaktylos MDa, Robert H. Andres MDb, Harald M. Bonel MDc

aDepartment of Emergency Medicine, Inselspital Berne University Hospital Berne, Switzerland
bDepartment of Neurosurgery, Inselspital Berne University Hospital Berne, Switzerland
cDepartment of Radiology, Inselspital Berne University Hospital Berne, Switzerland

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Ventriculoperitoneal (VP) shunts are regularly implanted in patients with hydrocephalus. A regular and sometimes life-threatening complication after shunt implantation is disconnection at junction or a break at any point of the descending catheter [1]. In case of such malfunction, a “shunt series” consisting of 2-dimensional plain x-rays of the skull, chest, and/or abdomen has to be performed. To follow the path of the catheter, overlapping at radiologic exposures is unavoidable.

Because malfunction is a common complication, patients are repeatedly exposed to hazardous radiation, thus increasing the risk of malignomas [2,3].

Therefore, in our department we introduced a new technique for visualization of VP shunts using the Lodox Statscan (Benmore, South Africa; www.lodox.com). Statscan is based on enhanced linear slot-scanning technology, which produces high-quality full body anteroposterior and lateral radiographic images of any size. Statscan has been developed in South Africa to visualize efficiently multiple injured patients. The machine makes use of an x-ray tube mounted on one end of a C-arm. This emits a low-dose collimated fan-beam of x-rays. Fixed to the other end of the C-arm is the x-ray detector unit, comprising scintillator arrays optically linked to charge-coupled devices. The C-arm travels along the table length at speeds of up to 138 mm/s (13 seconds for a.p. view) when emitting radiation. This device is able to rapidly acquire images of part or all of the body; a full body a.p. and lateral scan requires a total of 5 minutes, with smaller areas requiring proportionately less time.

Statscan typically uses up to 75% less radiation than current x-ray technology, depending on the part of the body being scanned [4]. According to the manufacturer, although the mean conventional dose may be 0.573 R (5.73 mGy), the mean Statscan dose may be as low as 0.033 R (0.33 mGy) for certain conditions, 5.9% of the conventional dose.

In a test series, we used Statscan in 8 cases of suspected shunt malfunction. One example case is illustrated in Figs. 1 and 2. The patient was admitted with nausea and headache 8 weeks after VP shunt implantation. Statscan showed excellent visualization of the entire shunt, and no further x-ray exposure of the chest and the abdomen were necessary. A catheter break or disconnection was excluded as the reason for the described symptoms.

In conclusion, we can say that emergency physicians, neurosurgeons, and patients are very satisfied with the new technology because of reduction in time spent in the emergency department, complete visualization, and reduced exposure to radiation. Therefore, Statscan has been chosen

* Corresponding author.
as the standard evaluation procedure in such patients. Future prospective studies have to confirm the preliminary results of this report.

References


