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Penumbra: Majority of Jet 7 Malfunctions Unrelated to Contrast Injection, According to FDA Database

In response to an increase in injuries and deaths involving Penumbra's (PEN) Jet 7 XTRA FLEX catheter, the company sent a letter to doctors cautioning them against injecting contrast media, used to map the arteries of the brain during blood clot removal procedures, through the catheter. Doing so could result in the unintentional expansion of the catheter, rupturing the delicate arteries of the brain, the letter warned.

According to Penumbra, injecting contrast though the catheter is "not consistent with the intended use of the product," though neurointerventional doctors and other catheter manufacturers tell *The Capitol Forum* that the practice is routine during blood clot removals.

While a majority of the deaths and injuries involved the injection of contrast while the catheter was in the brain of patients, a *Capitol Forum* review of the FDA's database of device malfunctions found that roughly 75% of recorded Jet 7 malfunctions in 2020 did not involve the practice of contrast injection through the Jet 7.

Many of these malfunctions occurred during intended use of the Jet 7 as stated by Penumbra, such as aspiration of blood clots from arteries. These malfunctions, which commonly involved the catheter breaking in two inside the patient, did not often result in injury as the broken portions were able to be retrieved with another catheter.

Additionally, at least 19 Jet 7 malfunctions occurred outside of the body as the catheter was flushed with saline solution during the procedure, with the catheter expanding in a similar fashion as during contrast injection.

Asked for comment about the malfunctions and injuries that did not result from contrast injection, a spokesperson for the FDA reiterated to *The Capitol Forum* that "we are aware of the reports and we are looking into this matter."

In a comment to *The Capitol Forum*, Gita Barry, Penumbra's Executive Vice President of Global Marketing and Public relations, stated that "Penumbra comprehensively files medical device reports with the FDA for all adverse events associated with its products, as reflected in the MAUDE database and in accordance with medical device reporting regulations," adding that "Penumbra evaluates the medical device reports and takes all necessary and appropriate actions depending on the nature of the issue."

Barry also stated that MAUDE data should not be used solely to establish patterns and trends. Barry quoted disclosures in the MAUDE database that state that "this passive surveillance system has limitations, including the potential submission of incomplete, inaccurate, untimely, unverified, or biased data. In addition, the incidence or prevalence of an event cannot be determined from this reporting system alone due to under-reporting of events, inaccuracies in reports, lack of verification that the device caused the reported event, and lack of information about frequency of device use."

Barry's full statement can be found here.

Problems during stated use. According to Penumbra, "reperfusion catheters are designed for the removal of stroke-causing clots by aspirating or suctioning the clot out of the arteries in the brain," and the company's July 27 letter to neurointerventional doctors has attributed most of the issues regarding the Jet 7 to the off-label use of injecting contrast agent.

Between January 1 and August 31, 2020 there were 109 reports to the FDA's Manufacturer and User Facility Device Experience Database (MAUDE) regarding device malfunctions with the Jet 7 reperfusion catheter. Two deaths associated with the Jet 7 were reported to MAUDE on August 21, though those incidents occurred prior to the July 27 letter.

In an August 26 statement to *The Capitol Forum*, Barry said that Penumbra "is not aware of any new reports of events that were the subject of the Notification."

As *The Capitol Forum* previously reported, not all deaths occurred from the injection of contrast media. *The Capitol Forum* reviewed the event description for each of the 109 reports and found that, while the injection of contrast agent accounted for 19 out of the 26 Jet 7 deaths and injuries reported, 82 of the 109 device malfunctions reported did not involve the injection of contrast media (eight reports either did not have event descriptions or had inconclusive information).

Instead, those malfunctions appear to have occurred during what Penumbra says is the intended use of the catheter, including navigating to the blood clot, aspiration of the clot, and removal of the catheter from the patient.

For example, during a January procedure, "after successfully completing one pass, the physician decided to retract the Jet 7 to reposition it but experienced resistance while retracting. During the retraction of the Jet 7, the physician noticed that the tip of the Jet 7 no longer retracted. Subsequently, the Jet 7 split into two pieces, with the distal half remaining inside the internal carotid artery (ICA); therefore, a snare device was used to successfully remove it from the patient."

Physicians also reported that the Jet 7 was susceptible to distortion during the aspiration of blood clots, which is the catheter's main function.

During a procedure in April, "the physician placed the Jet 7, guidewire, and microcatheter in the target vessel and aspirated using the Jet 7. As the aspiration stopped, the physician removed the Jet 7. Upon removal, the Jet 7 was found ovalized four to five centimeters from the distal end; therefore, the Jet 7 was not used for the remainder of the procedure. It was also reported that without aspiration pressure, the Jet 7 reverted to its original form."

The Capitol Forum also found five incidents where multiple Jet 7 catheters broke during normal use during the same procedure, with one June procedure necessitating four different Jet 7 catheters.

"During the procedure, the Jet 7 collapsed while making the second pass. Therefore, the Jet 7 was removed," reads one report of an incident in January, "The physician continued the procedure using a new Jet 7, the same velocity, the same sheath, and a stent retriever. Upon removal of the devices using the trap technique, the physician found that the Jet 7 was fractured at the distal 3 cm location. Therefore, the Jet 7 was no longer used. The procedure was completed using another Jet 7, the same velocity, and a non-Penumbra stent retriever."

Inflation during saline flush. At least 19 malfunctions reported in 2020 occurred as the Jet 7 was being flushed with saline solution in order to clean it during the procedure, with the distal tip of the catheter expanding like a balloon. Because this process occurs outside of the body, none of the malfunctions resulted in injury or death.

During a procedure in May, for example, "the physician completed one pass using the Jet 7, the balloon guide catheter, and the stent retriever, then removed the Jet 7. While flushing the Jet 7 on the back table, it was noticed that the distal tip of the Jet 7 expanded. Therefore, the Jet 7 was not used for the remainder of the procedure."

Flushing a catheter with saline is a normal part of blood clot removal procedures, according to a neurointerventional doctor who spoke with *The Capitol Forum* on the condition of anonymity.

This phenomena bears resemblance to the expansion that occurs when contrast agent is injected while the Jet 7 is in the brain of patients, indicating that the Jet 7 may have issues with fluids passing through it.

Indeed, in the July 27 letter to doctors, Penumbra acknowledged this problem, telling doctors to "use caution and slowly flush heperinized saline."

Proposed solution does not appear to address all issues with catheter. Recently, Wells Fargo issued a report stating that it believes the company will "launch a solution" that will allow physicians to introduce contrast through the guide catheter without removing the reperfusion catheter.

While this proposed solution may address the contrast agent issue, it may not address other issues with the Jet 7 XTRA FLEX catheter detailed above.

These issues have already stalled the launch of the Jet 7 XTRA FLEX in nations like Japan. Medico's Hirata, Penumbra's distributor in Japan, sent a letter, which *The Capitol Forum* translated, to its customers on June 23, several weeks before Penumbra's letter, warning them of the dangers of injecting contrast agent through the catheter.

That letter states that there have been cases in which a part of the catheter inflated like a balloon and damaged a patient's blood vessel, noting that as of June 15, 2020, there were three injuries in Japan and eight overseas.

Asked about the distributors plans to delay the launch of the product, Barry said that "it is our understanding that the distributor paused sales during the initial launch while we updated the Instructions for Use. We have been told that once the updated instructions are approved by the Japanese regulatory body, the launch is planned to resume."

Medico's Hirata declined to comment on the status of the Jet 7 XTRA FLEX in Japan.

Comparison with competitors. *The Capitol Forum* compared MAUDE reports regarding Penumbra catheters with those of competitors such as Stryker's Vecta line.

During 2020, 145 device incidents involving reperfusion catheters were reported to MAUDE. Of these 145 incidents, 140 involved Penumbra catheters, with 115 of those incidents involving the Jet 7 and the rest involving Penumbra's older line of ACE 68 and MAX catheters.

Barry declined to address on the comparison with competitors.