Stroke networks and telemedicine diffusion: update of an Italian national survey

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Objectives – This study aimed to investigate the diffusion of telemedicine in Italian stroke networks. With an online questionnaire to assess: type of stroke care setting, Volume of thrombolysis-thrombectomy/year, access to stroke care between different hospitals, the presence of imaging sharing protocols within the network or patients dispatchment screening; type of network solutions.

Background – Telemedicine has been used to improve access to care by allowing a neurologist at a remote location to interact with the patient and their family members. Prior studies have shown that the use of telemedicine for treatment of AIS is not only safe and effective, but it also increases the utilization of tPA, there by improving patient care and outcomes.

Methods – We have interviewed 26 Italian neurologists, working in large urban areas, from north southward, including Italian islands. In particular, these neurologists represented 14 different regions and 18 counties. A majority of neurologists replying to the survey (52 %) worked in large general hospitals, or smaller general hospitals (24%) a smaller number of physicians (14%) were committed in University Hospital or (10 %) independent foundation hospitals.

Results – The 65% of stroke networks involved in the survey had a low thrombolysis/year volume while the 35 % had a thrombolysis/year volume above 100. According to the survey a local stroke network was established in 90% of cases. In the 50% of cases, the hospitals care is not homogeneous within the network. A network for the consultation of neuroimaging between hospitals is available in 40% of cases. In those describing an active network for Teleconsult (seven) the 50% used personal mobile devices, while only the 30 % use professional teleconference system, and in 20 % of cases used medical devices.

Discussion and Conclusions – Our findings demonstrated a relevant diffusion of Teleconsult in Italian stroke networks. The systems adopted are mostly individual solutions not integrated in protocollar pathways. These findings may encourage a systematization of Telemedicine medical curricula to increase larger access to neurological consults.

Table 1. Volume (%) of thrombolysis and thrombectomy in participating hospitals.			
	Year	N.	%
Thrombolysis	<10	2	8.70
	10-20	0	0.00
	>20	11	60.87
	>100	7	30.43
Thrombectomy	<10	10	43.48
	>10	13	56.52

Table 2. Questionnaire answers overview.			
Question	Answers	n.	%
In your county is established a network of hospitals for the treatment of stroke?	No	2	15.38
	Yes	21	84.62
Access to therapies is homogeneous in all the different hospitals of your area?	No	11	46.80
	Yes above 70%	12	50.00
	Yes at 300%	1	4.17
	Yes at 100%	1	4.17
Is there a network for the consultation of neuroimaging between hospitals?	No	8	33.33
	Yes	1	4.17
	Yes inside the county	8	33.33
	Yes between more counties	9	35.47
Do you have hospitals consultations or telephone contacts to agree on treatment procedures or transfers of patients?	No	0	0.00
	Yes in selected cases	9	37.50
	Yes always	15	62.50
Do you use videocon and/or teleconferences to evaluate neuroimaging data or clinical cases?	No	12	57.14
	Yes	9	42.86
If yes, what kind of technology do you use?	Certified medical devices	2	28.57
	Teleconferencing systems, and medical devices	1	14.29
	Other devices, including personal smartphones and/or social media	4	57.14
	Other devices	2	28.57

Access to therapy is homogeneous in your network
NO 44%

Imaging is shared in the networks
NO 33%

HUB-Spoke Consults in the network are routinely done ?
YES 66%

Consults are Audio plus video
YES 45%

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References

Corea F, Hubert G, Abilleira S. Letter by Corea et al. Regarding Article. Telemedicine Quality and Outcomes in Stroke: A Scientific Statement for Healthcare Professionals From the American Heart Association/American Stroke Association. Stroke 2017;48:e139.

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