

Management of an aphasic-apraxic patient during the Covid-19 pandemic: a case report.

Gestione di un paziente afasico-apratico durante la pandemia di Covid-19: un case report.

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ABSTRACT

Anarthria represents a very rare form of aphasia that is not associated with major motor impairments; the guidelines for aphasia indicate speech therapists to intervene quickly and intensively together with physiotherapists both in the acute and sub-acute phase during hospitalization in a second-level rehabilitation facility. However, if the motor impairment is not present or minimal, the choice to keep an anarthric patient in a rehabilitation facility for at least 4 weeks, instead of following him only in the out-patients clinic, has proved to be effective in terms of time and results.

L'anartria rappresenta una forma molto rara di afasia che non è associata a gravi menomazioni motorie; le linee guida per l'afasia indicano ai logopedisti di intervenire rapidamente e intensamente insieme ai fisioterapisti sia in fase acuta che sub-acuta durante il ricovero in una struttura riabilitativa di secondo livello. Tuttavia, se la compromissione motoria non è presente o minima, la scelta di tenere un paziente anarthrico in una struttura riabilitativa per almeno 4 settimane, invece di seguirlo solo nella clinica ambulatoriale, si è dimostrata efficace in termini di tempo e risultati.

Introduction

Anarthria usually is considered as an impairment of the phono-articulatory programming in absence of peripheral alterations of the muscles involved in the realization of speech, and can emerge due to a brain injury of the left hemisphere (Nichelli, 2016). Initially, this impairment was described as a pure motor aphasia defining it as a disorder characterized by alterations strictly limited to oral expression, in the absence of a comprehension deficit and with input and output selective saving of written language (Bisiach, 1990; Làdavas & Berti, 2014; Wertz et al., 1984). International literature provides some data on the prevalence and incidence of AA, but they are often related to mixed forms. A study by Duffy et al. (Duffy, 2020) on the Database of the Mayo Clinic (USA), diagnosed in 4.6% of 3417 patients evaluated for unspecified speech articulation disorders, the pure form of AA. However, most of these patients (about 80%) have AA deficiency as a symptom associated with a primary production aphasia, as confirmed by the study Wertz et al. (Wertz et al., 1984). According to this data, the incidence of AA would be about one in 1360 subjects (0.07%) for approximately 200,000 cases, in the USA. The rates compared on scale, to the Italian population imply an assumed prevalence of 45,000 cases of pure AA or associated with production aphasia for a population of about 61 million (Vallar et al., 2012).

In severe cases, the deficit alters the articulatory motility up to a deletion of the phonemic sequences that should occur in a context of co-articulation. Indeed, historically, the most severe forms of this deficit were described as phonetic disintegration (Bisiach, 1990). According to the theory on disconnection syndromes (Geschwind, 1965), the lesion involving AA, (which refers to a lesion located in the left hemisphere), would save the Broca's area (lap of the III prefrontal gyrus). It would target the space immediately below, and specifically the quadrilateral space of Pierre Marie, which consists of the lenticular nucleus and underlying white matter interposed between it and the frontotemporal cortex (Bisiach, 1990). In clinical practice the impairment is rarely present isolated, but frequently present in an association with bucco-lin-guo-facial apraxia, other forms of aphasia or signs of right facial hemiparesis (Làdavas & Berti, 2014).

The patient suffering from this impairment could therefore, lose the ability to articulate any sound and appear completely incapable of verbal communication while fully understanding it. Very often these cases, evidence an alteration of the prosodic component of speech, with the possibility of presenting foreign accent syndrome (Di Stefano et al., 2019). In clinical practice when a patient presents speech therapy symptoms (damage that compromises, alters or modifies communication at various levels without motor impairments), after the acute phase, in the presence of an impairment, even motor related, the procedure requests hospitalization in a second level rehabilitation facility. There are no clear indications about hospitalization at a second level rehabilitation facility in the presence of pure speech therapy symptoms. In this case, the patients' hospitalization aims at guaranteeing intensive rehabilitation services even in the earliest period of the sub-acute phase, as recommended by the Italian LG aphasias, drawn up by the FLI (*FLI - Federazione Logopedisti Italiani*).

Speech therapy in the acute and sub-acute phase involves the use of visual, tactile and proprioceptive feedback (*FLI - Federazione Logopedisti Italiani*). In July 2020, in the midst of the Sars-Cov-2 pandemic, the use

of Personal Safety Protection Devices (SPD) and the rules on prevention and safety to avoid the spread of the Covid-19 virus prevented the use of classic rehabilitation techniques, forcing operators to use alternative strategies). The same access to the ward was forbidden to caregivers, in order to keep the hospital environment as isolated as possible from the outside; this had as a secondary effect, the impossibility of continuous stimulation (in the acute phase) from the caregiver and a deflection of the patient's mood, a factor that influenced a great deal the motivational aspects. During the sub-acute phase, it was possible to restore at least visual feedback by using plexi-glass barriers. As for defining the acute phase, we intend the first days following the traumatic event (with hospitalization in the neurology department), whilst for the sub-acute and chronic phases we intend the period that starts two weeks after the traumatic episode (with hospitalization in a second level rehabilitation department).

During the acute phase, the use of audiovisual technology permitted a constant and continuous stimulation, also thanks to the support, in remote of the patients' caregiver. Mobile devices (smartphones or tablets) were engaged to record short videos that could act as positive or negative feedback for the patient. In the sub-acute phase, transferring the anarthric patient to the rehabilitation department, opposed to his discharge at home directly from the acute ward, offered the opportunity of performing intensive speech therapy stimulation. The choice of proposing to the patient an outpatient rehabilitation (even only in remote) could not have offered the same intensity of therapy. Hospitalization was possible despite the absence of impairments in gross motor skills and in the neuropsychological domain of awareness (the patient, in fact, did not present plegia or agnosia).

The aim of this study is to describe the rehabilitation method applied to a patient with predominantly anarthric impairment, and the results obtained from the application of this methodology both in the acute as in the sub-acute phase.

Case Report

D. 43 years old: suffered an embolic ischemic stroke on the left fronto-temporal site due to ICA dissection with a slight right hemiparesis, that returned to normal a few hours after the event, and anarthric deficit. Magnetic resonance imaging (MRI) highlighted, among other aspects, the presence in the left hemisphere of a large hyper-intense cortico-subcortical area, compliant with an area of water restriction, referred to an ischemic injury. A Cranial CT scan reported a hypodensa stabilized ischemic lesion in left frontal subcortical region.

The acute phase

Acute speech therapy evaluation: presence of non-fluent aphasia associated, severe verbal apraxia with very serious articulatory deficit. A diagnosis of anarthria with associated Apraxia BLF, was evidenced; there was a slight agraphia that returned to normal spontaneously in the first days from the event. The assessment was conducted following guidelines, through meetings initially brief in order not to overload the patient from a cognitive point of view (*FLI - Federazione Logopedisti Italiani, s.d.*). Subsequently, a clinical observation was conducted about 36 hours after the event and specific objectives were set such as: promote diaphragmatic breathing and PF coordination to stimulate phonation, activate the articulatory component with short audiovisual feedback (use of the patient's mobile phone for the creation of videos)

of increasing difficulty, that can be managed by the patient independently during the day, empower written language to ensure a written telephone communication with relatives and friends, reinforce the extra-verbal component to manage more efficiently/successfully the interaction on the ward, Conversation therapy.

Speech therapy training during the acute phase: due to the emergency Covid-19, training during the acute phase was conducted every other day by two different specialists and the patients' caregivers, that were included in the patients' treatment by means of computer media, in remote. Initially, D received a simple (yes/no) communication table/chart, in order to permit and help the patient interact with staff. In order to obtain phonation, in collaboration with the physiotherapists it was possible to perform diaphragmatic breathing, after instructions/ sessions.

Once voluntary phonation was reached (even if maintained only for a few seconds), the therapists focused on mandibular grading exercises, in order to ensure the correct articulation of some vowel sounds. At this stage, video and audiovisual media was implemented because the visual feedback needed for this type of commitment could not be provided due to the PPE, made necessary by the ongoing pandemic.

Caregiver involvement was mediated by specific training, this way the patient received daily intensive stimulations, even if only by remote.

Assessment in the sub-acute phase: After 15 days D. was transferred to the Department of second level Physical Medicine and Rehabilitation hospital and was taken immediately into care by speech therapists.

During admission the patient was alert and cooperative, a qualitative-quantitative evaluation was carried out through the ENPA test (Neuropsychological Examination for Aphasia), which is an evaluation tool to measure the functional impairment in different areas including language, in the aphasic patient (Làdavas & Berti, 2014). As far as the qualitative aspects are concerned, the following emerges:

- Verbal expression and phonation are absent; presence of sterno-costal breathing, with recruitment of the sternocleidomastoid muscle in inspiration;
- Severely impaired articulation, with associated Apraxia BLF. The automatic series of speech are not preserved;
- Preserved verbal comprehension at a contextual level, regarding simple and complex orders;
- Partially preserved written language for words with high frequency of use in both input and output. Phonemic paragraphs are present, in words with a lower frequency of use;
- Adequate extra-verbal communication, but it does not fully support communication. Yes and no are present with a slight nod of the head movement that in a first moment creates progressive fatigue;
- Current awareness of the disorder is present, with tendency of a depressive mood.

From the ENPA assessment, the results highlighted below emerged:

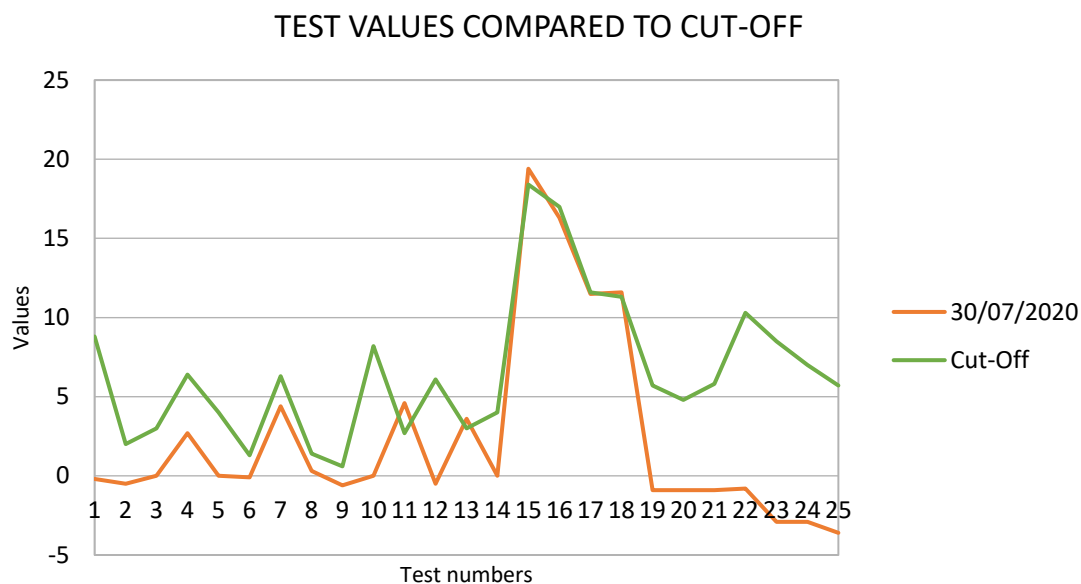


Figure 1 Test Values compared to cut-off T1

The ENPA test was administered before speech therapy training (T0), and after speech therapy training (T1).

As the graph illustrates, all tests are lower than the pathological cut off at T0, with the exception of tests 11, 13, 15 and 18 (written names, written words, auditory comprehension of words and visual comprehension of sentences). Therefore: repetition (1-words, 2-non-words, 3-sentences), reading (4-words, 5-non-words, 6-sentences), writing (7-words, 8-non-words, 9-sentences), oral naming (10-nouns, 12-verbs, 14-colors), comprehension (16-visual of words, 17-auditory understanding of sentences) and all word lists (19-f, 20-a, 21-s, 22-animals, 23-objects, 24-nouns, 25-verbs), result inadequate/poor.

The project beneficiaries are D. and his family. In the acute phase, the Speech Therapists of the M.F.R. of the SS. Antonio and Biagio and Cesare Arrigo Hospital of Alessandria are the referents, as consultants of the Neurology department, whilst in the sub-acute phase the referents become the Speech Therapists of the second level M.F.R. of the hospitals' Borsalino Presidium.

Speech therapy management, on admission to the Borsalino rehabilitation facility was carried out daily, 5 days a week, for a total of 10 hours, in order to offer the patient an intensive stimulation, compared to the 8 hours per week planned for patients who have mixed motor and speech disorder symptoms. Therapy sessions lasted 4 weeks.

During this period, the patient was treated with the "Creative, stimulating, rehabilitation method of oral and written communication with musical structures" (Duffy, 2020; Nichelli, 2016). The acquisition of the main

phonemes in different articulatory contexts was progressive and had stimulated the use of an increasingly accurate proprioceptive and visual feedback. We went from a condition of agrammatism (due to the strong impairment, the difficulty in self-perception and in the use of feedback) to a condition of sufficient LME. During the day, when the patient was not engaged directly with speech therapists, he tried spontaneously and at our suggestion to carry out further exercises (adapted to the patients 'age) aimed at empowering the feedback already activated and under way, by the use of this method.

Follow up

The follow up assessment was carried out at T1 (4 months after T0). The tool used was again the E.N.P.A.

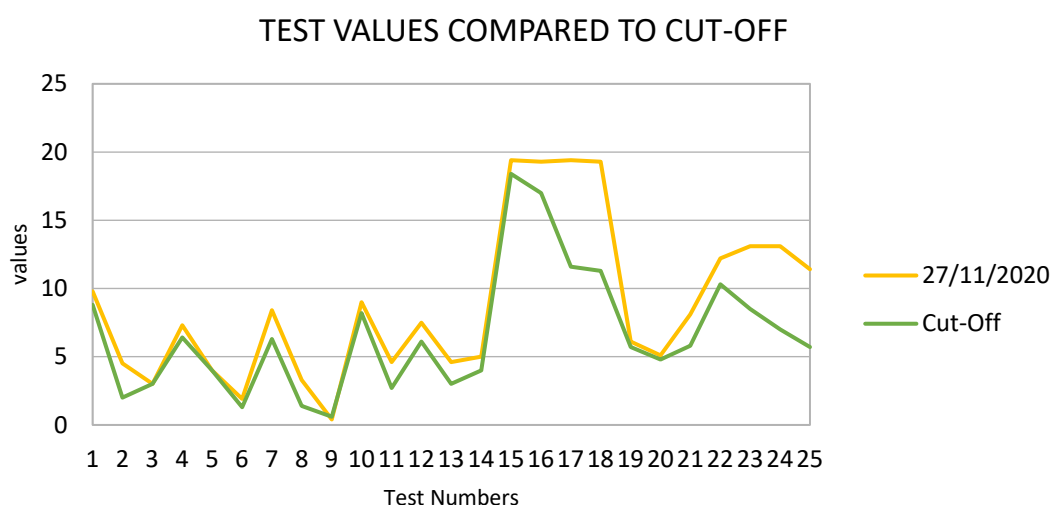


Figure 2 Test values compared to cut-off T2

As it can be seen from the graph, all tests evaluated the performance is superior to the pathological cut off. From a qualitative point of view it is possible to observe the following:

- The patients' mood has greatly improved joking and laughing in a suitable way and maintains a positive attitude during test administration.
- As for the articulatory phono aspect, the pronunciation of the words is possible although there is very often hyphenation that highlights a difficulty of co-articulation. This problem is evidenced in all the tests.
- Word repetition is correct there are some errors in sentence repetition without attempts of self-correction.
- Good resolution of some conduites d'approche during reading.
- Writing is mainly correct, with some errors due to the difficulty of self-monitoring.
- Denomination is normal with the presence of some semantic error, however maintaining a good relevance to the stimulus.

- During this assessment it was possible to carry out the tests not performed in the previous evaluation, not considered for the purposes of quantitative analysis:
- Word production results normal, even if it is affected by hyphenation and conduites d'approche. The description of a complex figure is correct, although all linguistic production is characterized by dysprosody.
- Comprehension is perfectly normal.

Overall, the patient has improved in all areas, but there remains a serious prosodic disorder and an inadequate speed of articulation.

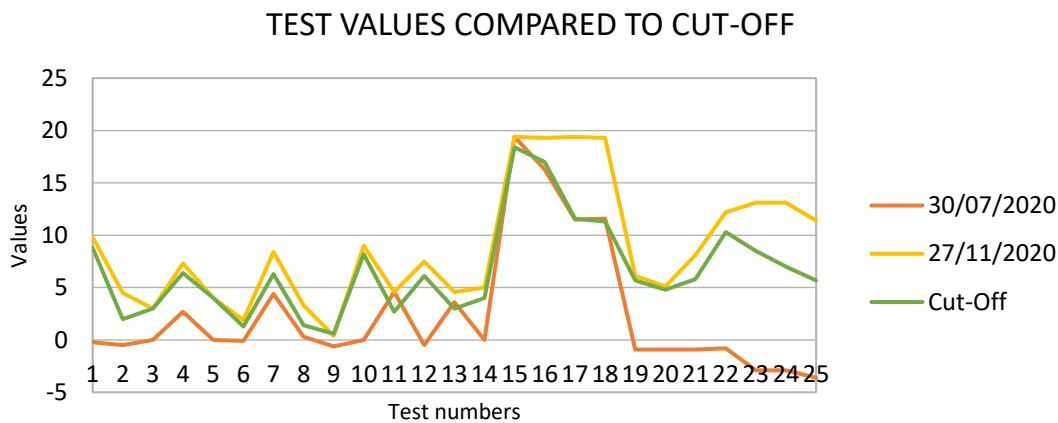


Figure 3 Test values compared to cut-off T1 T2

The evaluation carried out at T0 and T1 reveals significant improvements in all the tests analyzed, including those specific to verbal language.

Reported below are the specific graphs referring to the tests of repetition, denomination and reading aloud.

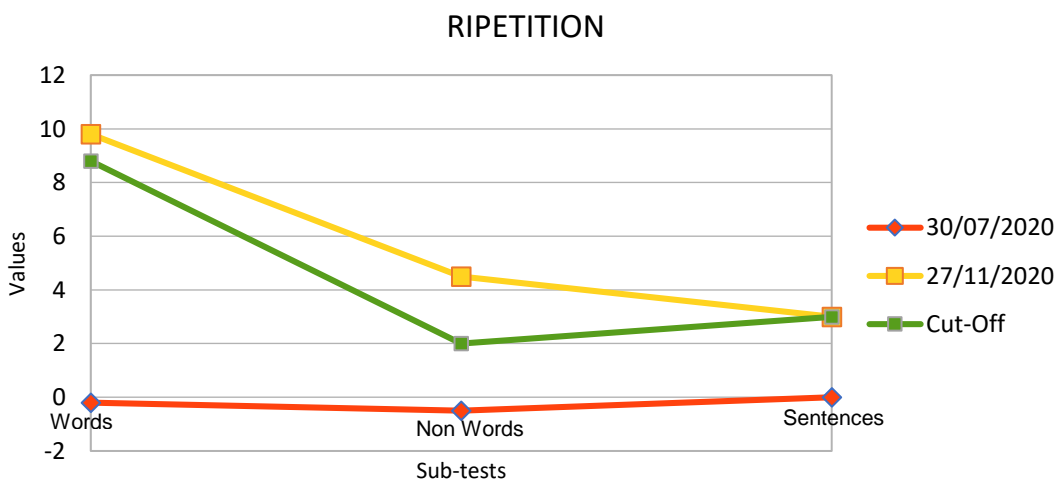


Figure 4 Ripetition

The written denomination, of nouns and verbs, was superior to cut off already at T0, as a modality spared from the injury, was involved.

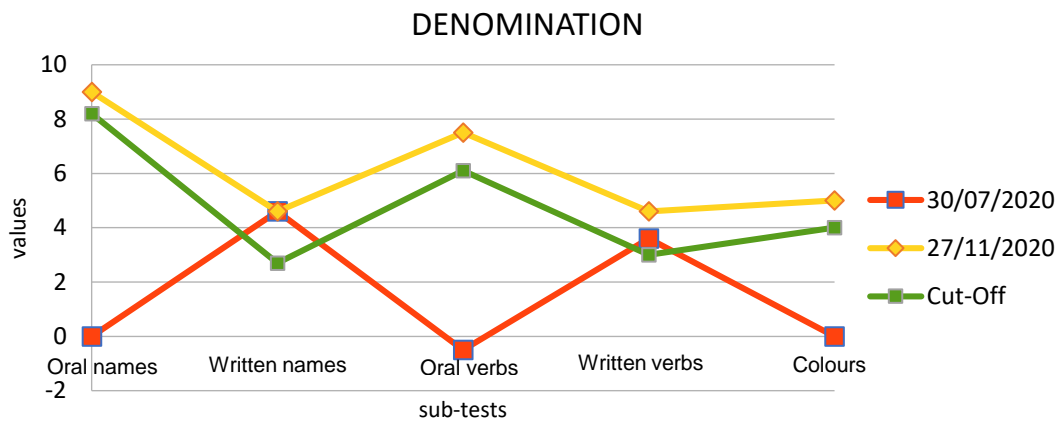


Figure 5 Denomination

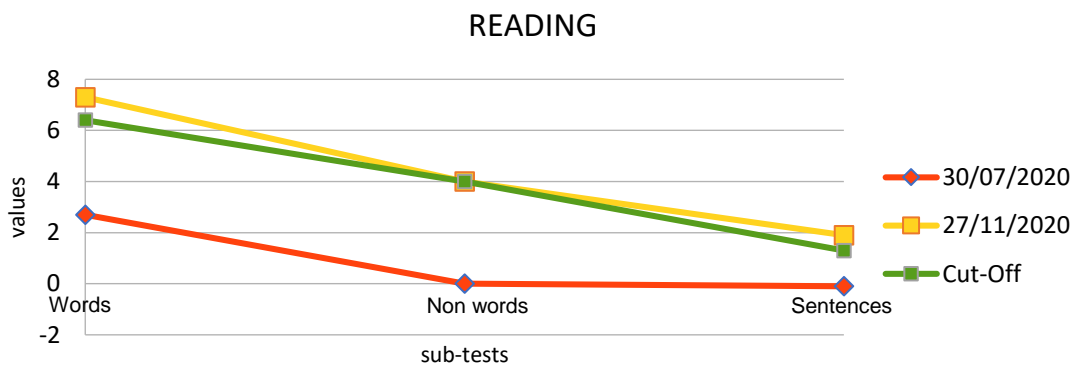


Figure 6 Reading

Conclusions

What emerges from this study, related to the importance of early management (LG Aphasia), also through the help of audiovisual tools to engage and include the caregiver in the patients treatment, supports and confirms evidence already present in literature. In the sub-acute phase, intensive speech therapy during hospitalization permitted continuous and assiduous management, and the combination of interventions in the acute and sub-acute phase enabled to achieve the results highlighted by the instrumental assessment, despite the strong limitations imposed by the Sars-Cov-2 pandemic.

The Aphasia Guidelines have not shown clear indications regarding the choice whether or not to offer hospitalization in a second level facility for patients who present only pure speech therapy symptoms. However, our experience has shown that the 4-week hospitalization at a second level rehabilitation facility has enabled an intensive treatment that has produced a faster recovery of compromised functions and the improvement of the QoL of the patient and his family, providing lasting results.

Consensus

The person described in the document has given written consent. Every reference to the person has been anonymized.

Declaration of interest statement

The authors declare that there is no conflict of interest.

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