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Nursing's approach and rehabilitation in a severe case of miliary tuberculosis complicated with stroke.

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ABSTRACT

Background: Miliary tuberculosis is a haematogenous dissemination of Mycobacterium Tuberculosis (M. tuberculosis) which involves especially lungs, central nervous system and lymph node. It is a very severe disease with an increased risk of respiratory failure, extensive neurologic sequelae and high mortality. A rapid diagnosis and specific treatment is tremendously important for outcome. Association of stroke is common in tuberculous meningitis (MTB) and could delay the diagnosis and worsen the prognosis.

Case presentation: We present a case of 24 years old male, who presented asthenia and 20 kilo weight loss during the last 2 years before admission in hospital. He came in hospital, directly in Intensive Care Unit (ICU) for left hemiplegia followed within hours of fever, repeated focal seizures and coma, reaching a Glasgow score of 6 about 48 hours after admission. Patient required orotracheal intubation. The Chest radiograph revealed micronodular opacities compatible with miliary TB and the cerebrospinal fluid (CSF) examination led to suspicion of TB meningitis. The TB etiology was bacteriologically confirmed in sputum and cerebrospinal fluid. After 24 hours, the CT and angio-MRI detected the ischemic lesion in the middle cerebral arterial territory. The injectable antituberculous treatment with 4 drugs was immediately

initiated. Parenteral corticosteroids, anticoagulant, symptomatic treatments were associated. The patient received a very complex and prolonged nursing intervention followed by neurologic and pulmonary rehabilitation in ICU and in the Pneumophtisiology Department. The rehabilitation team identifies the all subjective and objective demands and plan the nursing process of care. When patient gains consciousness the neurologic and pulmonary rehabilitation were started. The evolution was slow, but favorable, after 6 months of treatment the impairment of left hand movement being the only remaining sign of the past disease.

Conclusions: Collaboration medical team consisting of a neurologist, pulmonologist, infection disease specialist and physiotherapist increased the success rate, diminish the sequelae and improve the quality of life of the patient.

Keywords: miliary tuberculosis, meningitis, stroke, nursing, rehabilitation

Introduction

Miliary tuberculosis is a haematogenous dissemination of Mycobacterium Tuberculosis (M. tuberculosis) which involves especially lungs, central nervous system and lymph node. Tuberculous Meningitis represents 1% from all type of TB in immunocompetent persons and affects commonly in infants or children [1,2]. In young adults MTB appears from reactivation bacilleemia in the presence of risk factors: alcoholism, malnutrition, malignancy,

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human immunodeficiency virus (HIV) infection, immunosuppressive treatment including anti TNF alpha. One third of TB meningitis is secondary to limpho-hematogenous dissemination, miliary TB being seen on chest X-Ray³. It is a very severe disease with an increased risk of respiratory failure, extensive neurologic sequelae and high mortality. A rapid diagnosis and specific treatment is tremendous important for outcome. Association of stroke is common in tuberculous meningitis (MTB) and could delay the diagnosis and worsen the prognosis. The studies have shown that MTB associates ischemic strokes caused by vasculitis or intimal proliferation, with or without inflammatory exudates, thrombosis, aneurysmal dilatation and granulomatous septic embolism^[4,5].

Material and method

Retrospective study about hospitalizations and day clinic monitoring of a severe form of disseminated tuberculosis complicated with brain infarction of the middle cerebral artery patient. Written patient and family agreement was obtained in order to publish data and images in scientific paper.

Case presentation

We present a case of 24 years old, male, admitted directly in Intensive Care Unit (ICU) for left hemiplegia followed within hours of fever, repeated focal seizures and coma, reaching a Glasgow score of 6 about 48 hours after. Patient required oro-tracheal intubation. The patient's history reveals that he had close TB contact with his parents diagnosed, 2 years ago, with contagious forms of secondary TB. During this 2 years the patient presents asthenia and

progressive weight loss (20 kilos in 2 years). The HIV test was negative. No other risk factors or disease were found. The Chest radiograph and CT reveal micro-nodular opacities compatible with miliary TB and cerebrospinal fluid (CSF) examination led to suspicion of TB meningitis (table I).

Table I Biochemical, cytological and bacteriological results in CSF

CSF	48 hours	2 weeks	4 weeks
Clinic status	coma	coma	Impaired consciousness
Glasgow score	6	8	13
Pandy	positive	positive	
Elements/mm ³	86	344	0
Cytological exam-lymphocytes	88,4%	92,4%	-
Clorurorahie mmol/L	113	116	normal
Glicorahie mg %	20	26	normal
GeneXpert	positive	-	-
M. Tuberculosis culture	positive	-	negative

The TB etiology was confirmed, acid fast bacillus was positive on Ziehl-Neelsen stains, M. tuberculosis was positive in molecular test (GeneXpert) and rapid culture in sputum and cerebrospinal fluid. After 24 hours, the examination of the brain using CT and angio-MRI detected the ischemic lesion in the middle cerebral arterial territory. The injectable antituberculous regimen with 4 drugs was immediately initiated. Parenteral corticosteroids, anticoagulant, symptomatic treatments were associated. After coma recovery, when patient gains consciousness was transferred in the Pneumophysiology Department in order to complete the specific anti-TB treatment. On admission to our department the clinical examination showed ineffective cough, aphasia, difficult swallow, high agitation especially during night, headache, severe pain at left forearm and shoulder, severe troubles of cognition, spatial temporal disorientation, presence of central venous catheter, bedridden due to left hemiplegia, ophthalmoplegia, intermittent

diplopia, the spontaneous respiratory rate was 18/minute, blood pressure = 110/80 mmHg, SpO₂=90-94%, sphincter incontinence. The daily nursing assessment included: respiratory and cardiovascular status, neurological status (including level of orientation and consciousness and motor status), musculoskeletal status with functional mobility scale (dependent- 4 degree impairment), nutritional status, bladder and bowel elimination pattern, laboratory studies (WBC- white blood cell count, erythrocyte sedimentation rate, liver and renal function, bacteriological exam for M. Tuberculosis). The team identifies the subjective and objective needs and plan the nursing process. The initial priorities were: assessing and monitoring the vital signs during the TB drugs perfusion, maintaining aseptic technique and free catheter line, avoid pain and neurological agitation, prevent a traumatic harmful, provide the skin care with preventing the skin breakdown, giving appropriate diet and emotional support. The intervention plan included the analgesic therapy and sedatives indicated by neurologist, in order to relief the pain and agitation, anticoagulant therapy for preventing clotting formation, accompanied by a close monitorization of the temperature and vital sign every 12 hours. The rehabilitation programme consisted postural drainage of airway secretions, maintain a proper position of patient, turn every 2 hours, perform a range-of-motion passive exercises, take the safety precautions to reduce the risk of falls, monitor the fluid intake. The first of our expected outcome was to ensure that there are no side effects of the anti TB treatment, to prevent and to treat the possible adverse events and complication, to maintain the vital function and to maintain the functionality of the central catheter. We also informed and educated the caregiver, represented by his mother, about the present disease, evolution, possible outcome and the correct action to take. The patient received Isoniazid (5 mg/kg of body weight), rifampicin (10 mg/body weight) and ethambutol (20 mg/body weight) and Amikacine (15 mg/kg of body weight) in one hour perfusion each. He also received parenteral corticotherapy, pyridoxine, liver and gastric protection. The evolution was slow, but favorable, the patient gain consciousness and became temporo-spatial oriented and he also recovered the ability to swallow after 2 month of treatment. The

central catheter was removed and oral treatment replaced injectable drugs. He slowly started to control his sphincters.

The nursing plan was adjusted and it became more oriented to pulmonary and neurological rehabilitation. The goals set by the rehabilitation team in cooperation with our patient and his family guided the therapeutic intervention for reducing spasticity and it was considered a reliable index for a successful outcome. Our rehabilitation program accomplished in 2 months (27/04/2015-29/06/2015):

- strengthening motor skills involves using exercises to help improve your muscle strength and coordination
- therapy for communication disorder helps to regain lost abilities in speaking, listening and comprehension
- neuroplasticity exercises to improve brain functioning
- clear spoken information for patient to understand of rehabilitation program and encouraging to cooperate
- the daily exercises of our patient: spoke about the rehabilitation program, explain the steps of the program, encourage to repeat in his mind every movement, exercises for stimulate the memory: questions about his family and friends, short numbers exercises, pictures with colors and animals. All this simple exercises stimulate the memory and learning abilities, improve the expressive aphasia; repeating a brain exercise could cause overstimulation of brain cell growth in targeted area and the formation of new connections in other areas[6].
- clear written/spoken verbal information for parent of our patient about daily rehabilitation program
- the assessment of spasticity to measure the regulation of tonus, to decide the physiotherapy goals, and to encourage the patient and his family. We use the Modified Ashworth Scale before and after rehabilitation program.
- the correct positioning is important to prevent spasm or injury and the patient need to moved at regular intervals (usually every two hours) to prevent bed sores.
- support and position the limb in good alignment reduce muscle imbalance and survivor pain. Use pillows or towels to improve arm positioning in bed.

- for eye movement and alignment deficits, exercises were advocated for convergence weakness and compensatory head postures were advised to aid gaze disorders[7]

- passive and active kinetotherapy , in supine position, 15 minutes relaxing massage before starting the exercises, 10 movements at each segment for both the upper and lower limbs, repeat the cycle twice.

Week 1 (27.04.2015-01.05.2015): Muscles strength: upper left limb=0; lower left limb=0; upper right limb=1; lower right limb=1

Week 2 (04.05.2015-08.05.2015): Significant pain for all movements, uncooperative patient

Week 3 (11.05.2015-15.05.2015): The patient used to move the hallux by own-self and stay to the edge of the bed with bilateral support for a few seconds; unable to maintained the posture of the head; significant pain.

Week 4(18.05.2015-22.05.2015): The patient is able to stay in sitting position for few minutes.

Week 5(25.05.2015-29.05.2015): The patient maintained the posture of head in a sitting position

Week 6 (1.06.2015-05.06.2015): The patient is able to stay in wheelchair several times of day

Week 7(8.06.2015-12.06.2015): Patient preoccupied with motivation, cooperative

Week 8 (15.06.2015-19.06.2015): In the day 55, the patient used able to achive stand on of the legs with bilateral support; he walked 3 meters.

Week 9 (22.06.2015-26.06.2015): The patient is able to walk 30 meters with bilateral support.

Week 10 (22.06.2015-26.06.2015): The patient is able to walk 60 meters with bilateral support

Muscles strenght: upper left limb=2; lower left limb=3-4; upper right limb=5; lower right limb=5

The bacteriological exams were negative for M Tuberculosis after 2 month of treatment. After 55 days after admission he walk for the first time (3meters double human support). The discharge plan included education regarding the treatment administration, continuing the rehabilitation sessions, programingnext neurological and pnemologicalex aminations,receiving social support if it is possible and education regarding the illness. After 5 month the clinical examination reveal that the patient could walk, no help needed, after 6 month he could claim 1 floor, after 8 month he only presented

theoculomotornervedisfunction and partial motor deficit of left hand. Also the chest X-Ray was normal. In present days the patient continues the neurological rehabilitation and antiTB treatment untill 12 month.

Discussion

Complication of MTB with stroke is a devastating risk factor for a worse prognosis[8,9]. Anuradha found that the stroke occurred in 30% of MTB patient and commonly infarcts involve the middle cerebral territory like in our patient, due to vascular damage. Through the clinical predictors of stroke the authors mention aged over 25 years, cranial nerve involvement, vision impairment, and stage III of meningitis[9]. Also the brain infarction is reported more often in HIV-TB co-infection[10]. Our patient had only TB exposure and no other risk factors were discovered. He remained in coma for 45 days when the prognosis was reserved. It is always needed to make a differentialdiagnosis between a secondary coma caused by a TB meningitis and a secondary coma due to a stroke. The GOLD standard for confirmed diagnosis is positive culture for M tuberculosis in CSF, like in our case[11,12]. Anti-TB treatment must be started even if we have only suspicion of TB meningitis diagnosis,since the bacteriological confirmation is obtained in 2 months. could represent a better diagnostic procedure, given the reason that a positive result is available in 2 hours. The effect of corticotherapy and aspirin for stroke prevention is controvertial[9]. The genetic investigation like GeneXpert could improve the rapid diagnosis, the result being available in 2 hours. The effect of corticotherapy and aspirin in prevention the stroke is controvertial[12-15]. Near pharmaceutical treatments, the nursing care interventions are very important. We underline the necessity to assess the condition of independency and dependency for every organ and function and establish the interventions and rationales for every needs[16,17,18]. Starting the motor and functional rehabilitation is very important

in order to prevent muscle atrophy and joint contractures[19]. Improving daily living skills and social reinsertion are the last expected outcome[20].

Conclusions

The case stress the importance of the multidisciplinary collaboration medical team consisting in a neurologist, pulmonologist, infection disease specialist and physiotherapist. Establishing a rapid diagnosis, start of specific treatment with (fortunately available) injectable medication, provide close and strict nursing care and access the kinetotherapy specialist for respiratory and neurological rehabilitation were considered crucial factors that played an important role in saving our patient live. The patient received very complex and prolonged nursing intervention followed by neurologic and pulmonary rehabilitation initiated in ICU and then continued and sustained in Pneumophtisiology Department. Role of his mother like caregiver was also substantial in addition with our team effort. The evaluation after 6 month of treatment revealed the presence of minimal neurological sequelae and a progressive improvement regarding quality of life.

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