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Characteristics of the Problems of a Patient with a Pituitary Tumour Treated Endoscopically through the Sphenoid Sinus

Charakterystyka problemów pacjenta z guzem przysadki mózgowej leczonym endoskopowo przez zatokę klinową

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Abstract

Introduction. Pituitary tumours are usually benign adenomas. Surgical treatment is most often dedicated to patients with adenomas that cause symptoms of pressure, such as visual disturbances, headaches or symptoms resulting from hormonal disorders.
Aim. The aim of this study is to present the characteristic problems of a patient with pituitary macroadenoma who underwent endoscopic surgery through the sphenoid sinus.
Case Report. An individual case study of a 42-year-old man with pituitary macroadenoma who underwent surgical treatment through the sphenoid sinus is presented. The patient's problem before neurosurgical treatment were headaches, which impaired his functioning. The postoperative period was uneventful, but required careful monitoring of the patient for cerebrospinal fluid leakage from the nose, diabetes insipidus and electrolyte disturbances.
Discussion. The case we analyzed required intensified multi-directional observation due to the risk of complications. After surgery, the patient was relatively quickly independent in everyday activities. Additionally, he required further support and education from the nursing team.
Conclusions. Endoscopic procedure through the nose and sphenoid sinus does not externally mutilate the patient, the postoperative wound is moved deep into the nose. The patient remains physically fit, quickly becomes independent in everyday activities, and requires little assistance from the nurse. Furthermore professional nursing observation of the patient after transsphenoidal endoscopic surgery allows detecting disturbing symptoms, enabling their early recognition and effective treatment. **(JNNN 2023;12(4):170–176)**
Key Words: endoscopic procedure, nursing problems, pituitary gland

Streszczenie

Wstęp. Guzy przysadki to zazwyczaj łagodne gruczolaki. Leczenie operacyjne najczęściej dedykowane jest pacjentom z gruczolakami, które powodują objawy z ucisku takie jak zaburzenia widzenia, bóle głowy czy objawy wynikające z zaburzeń hormonalnych.
Cel. Celem pracy jest przedstawienie charakterystycznych problemów pacjenta z makrogruczolakiem przysadki mózgowej poddanego operacji endoskopowej przez zatokę klinową.
Opis przypadku. Zaprezentowano studium indywidualnego przypadku 42-letniego mężczyzny z makrogruczolakiem przysadki, poddanego leczeniu operacyjnemu przez zatokę klinową. Problemem występującym przed leczeniem neurochirurgicznym chorego były bóle głowy, zaburzające jego funkcjonowanie. Okres pooperacyjny przebiegał bez powikłań, ale wymagał uważnego monitorowania pacjenta pod kątem wycieku płynu mózgowo-rdzeniowego z nosa, moczówki prostej oraz zaburzeń elektrolitowych.

Dyskusja. Analizowany przez nas przypadek wymagał wzmożonej wielokierunkowej obserwacji ze względu na ryzyko wystąpienia powikłań. Pacjent po zabiegu operacyjnym był stosunkowo szybko niezależny w czynnościach dnia codziennego. Dodatkowo ze strony zespołu pielęgniarskiego wymagał dalszej asekuracji oraz edukacji.
Wnioski. Zabieg endoskopowy przez nos i zatokę klinową nie okalecza zewnętrznie pacjenta, rana pooperacyjna przesunięta jest w głąb nosa. Pacjent zachowuje sprawność fizyczną, szybko jest niezależny w czynnościach dnia codziennego, ze strony pielęgniarki wymaga niewielkiej asekuracji. Ponadto profesjonalna pielęgniarska obserwacja pacjenta po operacji endoskopowej przezklinowej pozwala wykryć niepokojące symptomy dając możliwość wczesnego ich rozpoznania i wprowadzenia skutecznego leczenia. **(PNN 2023;12(4):170–176)**
Słowa kluczowe: zabieg endoskopowy, problemy pielęgniarskie, przysadka mózgowa

Introduction

Brain tumours can be located in almost any intracranial structure, making their treatment difficult. One of such structures is the pituitary gland, which plays an important role in hormonal management and the functioning of other endocrine glands. Pituitary tumours are usually benign adenomas [1], which, like other brain lesions, may affect morbidity, mortality, and the quality of life of patients. These lesions constitute approximately 2–20% of primary tumours of the central nervous system. They include pituitary microadenomas and macroadenomas, and in terms of hormonal activity, hormonally active and hormonally inactive lesions [2].

Microadenomas are tumours less than 1 cm in diameter that are diagnosed due to symptoms of hormonal hypofunction or accidentally. Macroadenomas, on the other hand, are tumours over 1 cm in diameter, causing symptoms due to mass effect or hormonal hyperfunction or hypofunction of the pituitary gland [1–5]. Macroadenomas growing in different directions cause different disorders. As they grow upwards, they can press on the optic chiasm, contributing to defects in the field of vision; growing in lateral directions, they may infiltrate the cavernous sinuses through which the cranial nerves (III, IV, V1 and V2, VI) pass, contributing to disorders such as double vision, ptosis, oculomotor muscle paralysis, and facial sensory disturbances; growing downwards, they can cause involvement of the sphenoid sinus, which may manifest itself in leakage of cerebrospinal fluid from the nose, obstruction of the nasal part of the throat and even infection of the meninges. These tumours can also cause headaches due to stretching of the dura mater. Larger adenomas destroy the pituitary gland and cause hormonal disorders, such as: partial or complete hypopituitarism, mild hyperprolactinemia in the case of pressure on the pituitary stalk ("funnel effect") [1,2].

The choice of treatment for pituitary tumours depends on several factors, including whether the tumour causes hormonal activity or inactivity of the pituitary gland, the size and growth rate of the tumour, and whether it causes symptoms caused by pressure on the structures surrounding the pituitary gland [3]. In the case of patients qualified for surgical treatment of adenoma, the preferred method of treatment is transsphenoidal surgery [1,3,5]. The aim of surgical treatment is to alleviate or withdraw symptoms, preserve surrounding neural structures, and prevent deterioration of vision and pituitary function [3].

Complications of transsphenoidal resection of pituitary adenomas occur in less than 5% of patients. These complications include: cerebrospinal fluid leakage, intracranial hematomas, nosebleeds, meningitis, paranasal sinus diseases, diabetes insipidus and new visual disturbances [1,5]. Postoperative mortality occurs in 1% of patients [3].

Neurosurgery nursing must follow the therapeutic procedures offered to hospitalized patients within neurosurgical departments. It must be adapted to the needs of patients treated with a given surgical method. Hence the need to present the care problems and care of a patient with a pituitary tumour treated surgically endoscopically through the sphenoid sinus.

Aim of the work. The aim of the study is to present the characteristic problems of a patient after endoscopic surgery through the sphenoid sinus of a pituitary tumour.

Case Report

A 42-year-old man admitted to the neurosurgery clinic due to pituitary macroadenoma. On the day of admission, the patient was conscious, verbally intact, and had no symptoms of neurosurgical deficit. The patient's main problem was severe headaches that impaired his functioning. Laboratory tests did not reveal pituitary hormonal disorders. Basic blood tests performed on the first day of hospitalization to prepare for surgery did not differ from reference levels.

On the third day of hospitalization, the patient underwent endoscopic removal of the tumour through the sphenoid sinus. The tumour was macroscopically completely removed. During the surgical procedure, the tumour bed was filled with fat collected from the abdomen (hence the patient had a small wound after fat collection on the abdomen near the navel). In addition, the patient had a Foley catheter inserted into the sphenoid sinus to support the "sealing pack" of the surgical site. Immediately after the surgery, the patient was transferred to the recovery room for gentle recovery from general

anaesthesia. After 4 hours, the man was transferred to the parent ward to the post-operative room to carefully monitor his health condition. The patient returned conscious, with preserved verbal contact, and without any neurological symptoms. A dressing was placed under his nose to absorb the secretions flowing from the nasal cavity, and a Foley catheter closed with a plug was inserted from the nasal cavity and still served as a support. The patient had a wound on his abdomen, near the navel, after removing a piece of fat (approx. 2 cm), covered with a sterile dressing. A Foley catheter was placed in the urinary bladder to monitor diuresis. The patient's basic parameters after returning to the home ward were as follows: RR 140/85 mmHg, heart rate 72 beats/min., SpO2 95%. On the postoperative day, the patient had no disturbances in consciousness or in the monitored vital parameters. However, increased diuresis was observed and the doctor on duty at the ward was informed. Due to the suspicion of diabetes insipidus, the man was given desmopressin and his water balance was continued to be monitored. Painkillers were administered according to the doctor's order. On the first day after surgery, the patient underwent a magnetic resonance imaging examination, after which the man could be placed in an upright position and could begin to function independently in terms of everyday activities. On the third day after surgery, the Foley catheter was removed from the patient's bladder, but very careful monitoring of fluid balance continued. The supporting catheter from the nasal cavity was removed only on the fourth day after the endoscopic surgery, and the dressing under the nose was kept and changed depending on the amount of nasal exudate. Every day the man had his blood taken (ionogram, complete blood count, CRP) and urine for examination (general urine test, with particular attention to the specific gravity of urine). The patient was discharged from the ward on the seventh postoperative day in good condition, without symptoms of neurological deficit, with the recommendation to monitor the amount of fluid intake and excretion.

The patient was diagnosed with the following care problems, typical after endoscopic surgical treatment through the sphenoid sinus:

Problem 1: Risk of Postoperative Complications (Hematoma in the Bed after Tumour Resection, Bloody Discharge from the Nose, Cerebrospinal Fluid Leakage, Endocrine Disorders)

Purpose of nursing care: Early detection of disturbing symptoms.
Nursing interventions:

1. Connecting the patient to a cardiomonitor and regularly measuring its parameters: blood pressure, heart rate, SpO2; recording parameters in the observation card.
2. Assessment of consciousness and pupil width.
3. Observation of the quantity and quality of exudate from the nasal cavity, changing the dressing under the nose depending on the amount of exudate.
4. Controlling the water balance.
5. Hormone replacement in the postoperative period (hydrocortisone, route of administration and dose indicated in medical orders) [6].

Assessment: No disturbing symptoms of postoperative disorders were observed, except for increased diuresis. The doctor on duty was informed about this fact and his recommendations were followed.

Problem 2: Risk of Diabetes Insipidus and Potential Electrolyte Disturbances

Purpose of nursing care: Early detection of symptoms of diabetes insipidus and electrolyte disorders.
Nursing interventions:

1. Throughout the entire hospitalization period, careful monitoring of the water balance — fluids ingested and excreted by the patient.
2. Daily body weight monitoring.
3. Explaining to the patient the need to control the water balance.
4. Teaching the patient how to conduct a water balance and involving him in cooperation in order to monitor the intake and output of fluids.
5. Performing regular urine tests (general urine test with urine weight assessment) and blood tests according to doctor's orders.
6. Implementation of therapy according to doctor's orders.

Assessment: The patient's water balance was kept accurate and the doctor was informed about any irregularities on an ongoing basis. The patient actively participated in monitoring the water balance.

Problem 3: Discomfort Caused by a Stuffy Nose (due to the Presence of a Wound Inside the Nasal Cavity, a Catheter Held in the Nose (Acting as a Support)) and a Dressing Held under the Nose, Disturbing Breathing, Intake of Fluids and Food, and also Disturbing the Patient's Rest and Sleep

Purpose of nursing care: Minimizing the discomfort caused by a blocked nose.
Nursing interventions:

1. Explaining to the patient the need to keep the dressing under the nose and the catheter in the nasal cavity.

2. Higher position of the head and torso while lying and resting in bed, ensuring a sitting position for eating meals.
3. Explaining to the patient the need to avoid blowing and clearing the nose, sneezing and coughing (such actions enable good healing of the surgical site in the first days and weeks after surgery and prevent leakage of the surgical site) [6].
4. Changing the dressing under the nose depending on the amount of nasal discharge using sterile compresses.
5. Facial skin care when using a dressing supported by a plaster.
6. Paying attention to the microclimate in the patient's room (airing the patient's room, avoiding placing the patient on a bed close to the radiator).

Assessment: The patient was aware of the problem and followed medical and nursing recommendations.

Problem 4: Discomfort Caused by Headache

Purpose of nursing care: Minimizing headaches.
Nursing interventions:

1. Assessment of pain according to a pain scale, e.g. VAS or NRS.
2. Administration of analgesic in accordance with the doctor's order.
3. Assessment of the effectiveness of the pain relief treatment undertaken.

Assessment: The patient's well-being improved.

Problem 5: Risk of Urinary Tract Infections Caused by Prolonged Retention of the Catheter in the Bladder

Purpose of nursing care: Minimizing the risk of urinary tract infections and detecting them early.
Nursing interventions:

1. Removing the catheter from the bladder as early as possible after surgery.
2. In cases where it is necessary to maintain the catheter in the urinary bladder due to the patient's health condition, explain to the patient the need to maintain it.
3. Providing the patient with guidelines on moving around with a urinary bladder catheter in place if it is kept in place for a longer period of time (the urinary bag is placed below the bladder).
4. Instructing the patient to report signs of urinary tract infection during the catheter period and after removal of the catheter from the bladder (urethral burning, lower abdominal pain, discomfort when urinating).
5. Current assessment of urine quantity and quality (colour, urine odour).
6. Body temperature monitoring.
7. Advising the patient to consume products that acidify urine.
8. Fulfilling medical orders.

Assessment: No signs of urinary tract infection were observed.

Problem 6: Self-care Deficit, Caused by Postoperative Weakness, Maintained with a Catheter in the Urinary Bladder, Maintained with a Support Catheter in the Nasal Cavity

Purpose of nursing care: Minimizing self-care discomfort.
Nursing interventions:

1. Explaining to the patient the need to keep the catheter in the nose, keep the catheter in the urinary bladder which interferes with everyday functioning after surgery.
2. Assisting the patient or providing assistance in everyday activities with which he has the greatest difficulty (eating a meal, changing clothes, hygiene activities).
3. Securing the patient during the first attempts to get up and walk after surgery.

Assessment: The patient tried to be independent in everyday activities despite postoperative weakness.

Discussion

The most optimal method of surgical treatment of pituitary adenomas is transsphenoidal endoscopic treatment [3,4,6–9]. A patient undergoing treatment of pituitary adenoma through the sphenoid sinus does not have a postoperative wound externally visible in the skull area, the postoperative wound is "shifted" deep into the nose. However, the treatment is not free from postoperative complications, therefore careful monitoring of the patient is necessary in the early postoperative period. Observation should be focused on haemorrhagic discharge, cerebrospinal fluid leakage from the nose or signs of meningitis [3].

One of the more serious complications is cerebrospinal fluid leakage [3,6,8]. The leakage of cerebrospinal fluid is minimized during surgical treatment in order to avoid more serious complications, such as: meningitis, inflammation of the ventricles of the brain, which may result in neurological deficit and even death of the patient. Hence, in current practice, autologous fat graft taken from the patient's abdomen is used to reconstruct and seal the operated structures. The fat for transplantation is collected from the lower quadrant of the abdomen,

and according to some neurosurgeons, it is advisable to collect it from the periumbilical area due to better cosmetic effects [7]. Hence, in the patient presented in this paper, there is a small wound around the navel. This wound was not a problem for the patient.

Postoperative, late cerebrospinal fluid leads occur in 0.6 to 7.6% of cases [7,10]. These patients undergo repeated surgery or undergo lumbar cerebrospinal fluid drainage, which unfortunately prolongs the patient's hospitalization. That is why it is so important to minimize CSF leaks [10]. Patients in the postoperative period must be instructed to avoid activities (e.g. Valsava manoeuvres, coughing, sneezing) that could cause pressure fluctuations in the nasal cavity [6,10].

A common complication after endoscopic surgery is diabetes insipidus [3,11]. The disorder requires treatment because it can lead to hyperosmolar dehydration manifesting itself in: irritability, hypoesthesia, epilepsy, coma, hypotension, acute tubular necrosis and renal failure [11]. Diabetes insipidus after pituitary surgery may occur in 18–31% of patients. In most patients, the disorder is temporary and is caused by dysfunction of neurons secreting ADH (antidiuretic hormone). It most often appears 24–48 hours after surgery and disappears when the ADH-secreting cells regain proper functioning. Postoperative diabetes is suspected when the patient has polyuria (over 3000 ml) with polydipsia in combination with low urine osmolarity. If the patient drinks fluids in response to thirst and the sodium level remains within the reference limits, the patient does not require treatment. In other cases, treatment with desmopressin may be necessary [3].

All patients after pituitary surgery require close monitoring of the amount of urine excreted and its osmolarity, thirst, and the level of electrolytes, especially sodium, in the blood serum in order to avoid hyponatremia [3,12].

In order to monitor accurate fluid balance in the early period after surgery, a catheter is kept in the urinary bladder, which is necessary to detect diabetes insipidus [13]. However, it should be emphasized that the catheter should be removed very quickly in a patient after surgery, and kept in place longer in the case of patients who require it due to their health condition. In the case of patients who regain mobility after surgery, a catheter kept in the bladder may interfere with the patient's mobility and even reduce the need for activity [13]. Unfortunately, keeping the catheter in the bladder also comes with the risk of urinary tract infections. Therefore, this type of complication should be taken into account and measures should be taken to minimize the risk of infection.

Most patients after pituitary tumour surgery require learning to monitor their water balance. The need for the patient's involvement in water balance may prove to be an important element of the care provided to the patient. However, the nurse still takes responsibility for its management. It should be emphasized that education in this area can facilitate the patient's transition from the hospital to the home environment [13].

Aiyer believes that transient diabetes insipidus is not a complication but a result of excessive manipulation during surgery and occurs within 24–48 hours after surgery [4]. According to Nayak, the development of diabetes insipidus in patients after transsphenoidal resection of a pituitary tumour is associated with higher postoperative morbidity and longer hospitalization. Patients with pituitary adenoma presenting with visual disturbances, suprasellar extension, and large tumours are at greater risk of postoperative diabetes [14].

Transsphenoidal procedures for pituitary tumours have a low complication rate, but fluid and sodium imbalance in the body are relatively common [12].

In the early postoperative period, hyponatremia may occur due to excessive release of antidiuretic hormone, most often occurring in the first 3 to 7 days after surgery [3]. Therefore, daily monitoring of electrolytes in blood serum is important. In case of their disorders, it is advisable to adapt the therapy recommended by the doctor to the patient's needs.

Perioperative endocrine care is also very important. In addition to the disorders mentioned above, endocrine disorders may occur in the form of acute adrenal insufficiency. Therefore, in addition to electrolytes and the amount of urine excreted, the morning cortisol level should be monitored [3]. The use of hormone therapy in the perioperative period is standard. Patients with confirmed secondary adrenal insufficiency should be treated with corticosteroids. Perioperative corticosteroid treatment may also be performed in patients with no known endocrine disorders, but such treatment may be justified by insurance against adrenal insufficiency during surgery. It has been shown that the response of cortisol (stress hormone produced by the stratum striatum of the adrenal cortex) to high stress associated with surgery lasts for 48 hours in healthy people, hence it is recommended to maintain corticosteroid treatment for 48 hours, and in many entities, gradual discontinuation of the drug is preferred [3]. However, it should be emphasized that the duration of treatment depends on the cortisol level.

Headaches are a problem observed in patients before and after surgery. Pituitary macroadenomas causing stretching of the dura mater cause, among other things, headaches [2,3]. They occur in 16–70% of patients with pituitary tumours, which they feel in the frontal and occipital areas [3]. In the discussed case, headaches were the dominant problem of the patient before surgery, which interfered with his daily functioning. In the postoperative period, pain is usually related to neurosurgical intervention and requires analgesic

treatment. The nurse's role is to monitor pain and take action to minimize or eliminate it.

The case of a man after surgery for pituitary macroadenoma presented in this paper was not a complicated case, it is a case of a patient without complications after this type of surgery. However, the patient required intensified multi-directional observation. After the surgery, the man relatively quickly became independent in everyday activities and required support from the nursing team and education in the above-mentioned issues. However, the analysis of the complications indicated above justifies that patients after transsphenoidal surgery for pituitary tumours in the early postoperative period must be very carefully observed and monitored in order to detect these disorders early. And the nursing team plays a special role in this area of care for these types of patients.

Conclusions

1. Endoscopic procedure, through the nose and sphenoid sinus, does not externally mutilate the patient, the postoperative wound is moved deep into the nose. The patient remains physically fit, quickly becomes independent in everyday activities, and requires little assistance from the nurse.
2. Professional nursing observation of the patient after transsphenoidal endoscopic surgery allows detecting disturbing symptoms, enabling their early recognition and effective treatment.

Implications for Nursing Practice

Nursing interventions for a patient with a pituitary tumour treated endoscopically through the sphenoid sinus must focus on observing the patient for cerebrospinal fluid discharge from the nose, symptoms of diabetes insipidus and electrolyte disturbances. Their early detection makes it possible to implement targeted treatment, improves the patient's functioning and shortens the hospitalization time.

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