Case Report

A case of minimal change nephrotic syndrome complicated by ovarian vein thrombosis

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The patient was a 54-year-old woman undergoing steroid treatment as a maintenance therapy of remission for minimal change nephrotic syndrome (MCNS). After pain appeared in her right-lower abdomen, an abdominal contrast computed tomography scan revealed thrombosis of the right ovarian vein. Laboratory evaluation on admission revealed proteinuria (3.5 g/day) and decreased serum total protein (4.9 g/dL) and albumin (2.4 g/dL) levels, indicating nephrotic syndrome recurrence. Leukocyte and C-reactive protein levels were elevated; over 100 leukocytes/high power field were detected in the urine, and E. coli was detected in both blood and urine cultures, indicating septicemia due to pyelonephritis. The thrombosis disappeared after approximately 27 weeks of heparin and warfarin treatment. The MCNS recurrence was treated with an increased steroid dose; after about 6 weeks, the patient was negative for urinary protein. Her pyelonephritis improved with antibiotic treatment. The patient was discharged in good condition on day 55 after admission. When patients with nephrotic syndrome complain of abdominal pain, venous thrombosis in the abdominal cavity should be considered.

Key words: minimal change nephrotic syndrome, ovarian vein thrombosis, pyelonephritis

Introduction

Various mechanisms can lead to thrombosis in nephrotic syndrome, including increased coagulability, loss of coagulation regulatory proteins through the urine, decrease of fibrinolytic proteins, and platelet activation. Complicating thrombosis is present in about 25% of adult nephrotic syndrome cases [1]. It is particularly common in membranous nephropathy, followed by membranoproliferative glomerulonephritis and minimal change nephrotic syndrome (MCNS) [1]. Thrombi tend to occur in deep and renal veins, and reports of thrombosis in ovarian veins are rare. Here we report our experience with a case of MCNS complicated by ovarian vein thrombosis.

Case Report

The patient was a 54-year-old woman with no history of miscarriage and nothing relevant of note in her medical or family histories. Nephrotic syndrome first occurred at 50 years of age, with total protein (TP) concentration of 4.7 g/
dL, albumin (Alb) of 2.4 g/dL, and 24-hour urinary protein level of 4.3 g/gCr. A kidney biopsy revealed that, of 12 glomeruli, most were normal, apart from 1 that was hyalinized and 1 that was collapsed. Based on these findings, the patient was diagnosed with MCNS. Treatment with 8 mg/day methylprednisolone was initiated, which was later increased to 16 mg/day. Following complete remission, the patient was put on a maintenance dose of 6 mg/day.

Four years later, at 54 years of age, the patient was examined as an outpatient at our hospital for right-lower abdominal pain and nausea. A plain abdominal computed tomography (CT) revealed thrombosis in the right ovarian vein, which was confirmed on contrast CT. Blood and urine tests performed that day showed a recurrence of nephrotic syndrome and pyelonephritis, so she was admitted to the hospital for more intensive treatment. At admission, the patient was 156 cm tall and weighed 37.7 kg. She regularly weighed 38 kg; thus, there was no evidence of weight change. Her body temperature was 37.0°C, blood pressure 100/71 mmHg, heart rate 105 beats/min, and SpO₂ 99% (room air). Physical findings revealed no palpebral conjunctiva anemia, no bulbar conjunctiva jaundice, no swelling or tenderness in the cervical lymph nodes, clear respiratory sounds, regular heart sounds with no murmur, a flat and soft abdomen, and good bowel sounds; however, there was tenderness in the right-lower abdomen. No costovertebral angle tenderness was found. Pitting edema was also observed on both lower legs.

Test results at hospital admission (Table 1) indicated nephrotic syndrome, with TP concentration of 4.9 g/dL, Alb of 2.4 g/dL, and 24-hour urinary protein level of 3.5 g/day. Selectivity index was 0.13. Leukocyte and C-reactive protein (CRP) levels were elevated; over 100 leukocytes/high power field were detected in the urine, and E. coli was detected in both blood and urine cultures, indicating sepsemia due to pyelonephritis. D-dimer level were elevated. Abdominal contrast CT indicated right ovarian vein thrombosis (Fig. 1). Contrast CT did not reveal any obvious thrombi in either pulmonary artery or from the descending vena cava to the deep veins of the lower limbs.

Since the MCNS recurrence and pyelonephritis were observed in addition to the right ovarian vein thrombosis, the treatment addressed all of the concurrent conditions. For right ovarian vein thrombosis, the patient was administered 10,000 units/day unfractionated heparin via continuous intravenous infusion, which was adjusted to extend the activated partial thromboplastin time 2–2.5-fold. Warfarin was
later added and the dose adjusted to attain a prothrombin
time–international normalized ratio of 1.5–2.5. The abdomi-
nal pain improved on day 3 after admission. Heparin admin-
istration was halted on day 6. The ovarian vein thrombosis
had shrunk on day 18, and furthermore it had become smaller
on day 71 (Fig. 2). The thrombosis completely dis-
appeared about 27 weeks after initiating treatment. The patient
was kept on warfarin without recurrence after 2 years. The
ovarian vein thrombosis required anticoagulant therapy im-
mediately upon admission, so a repeat renal biopsy was not
performed. Since the selectivity index indicated high selec-
tivity, treatment was conducted on the assumption of MCNS
recurrence. The methylprednisolone dose was increased
from 6 mg/day to 24 mg/day. After 4 weeks, urinary protein
levels had declined to 2 g/day, but without complete remis-
sion. Therefore, the methylprednisolone treatment was
switched to 40 mg/day prednisolone. Urinary protein gradu-
ually declined, with complete remission after about 6 weeks.
Cefazidime was administered for pyelonephritis and sepsis,
as E. coli detected in urine and blood cultures was sensitive
to this drug. Levels of CRP and urinary leukocytes improved
quickly. The patient was discharged in good condition on
day 55 after admission (Fig. 2).

Discussion

This case involved MCNS complicated by ovarian vein
thrombosis and pyelonephritis.

Ovarian vein thrombosis is a rare condition. It is more
common in pregnancy, occurring in 1/600 to 1/2000 preg-
nancies [2]. Previously, Wysokinska et al. reported in a se-
ries of 35 patients, 34% had an underlying malignancy, 34%
assumed hormone therapy, 23% experienced recent pelvic
infection, 20% underwent recent abdominal surgery, and
14% had postpartum ovarian vein thrombosis [3,4]. The
pathogenesis of ovarian vein thrombosis is attributed to the
3 classic factors that predispose to venous thrombosis: ves-
sel wall injury, venous stasis, and hypercoagulability (Vir-
chow’s triad) [5]. Vascular endothelial injury may result from
either direct surgical trauma or indirectly from local infec-
ton or inflammation. Ovarian vein thrombosis involved the
right ovary in 90% of cases. This is thought to occur due to
uterine dextrorotation resulting in increase stasis and longer
right ovarian vein with less competent valves. The hyperco-
agulable state of pregnancy is attributed to elevated coagula-
tion factor levels, increased platelet adhesion, and decreased
fibrinolysis [6]. Lower abdominal pain and fever are com-
mon symptoms. Diagnosis can be made by contrast CT (sen-
sitivity 100%, specificity 99%) or magnetic resonance imag-
ing (MRI; sensitivity 92%, specificity 100%) [7]. Pulmonary
embolism is reported in 25% of untreated cases [2]. In the
present case, congenital thrombotic factors were not likely
to have led to ovarian vein thrombosis because protein C and
S were within normal ranges. In addition, the patient had no
relevant prior history, such as malignant tumors or pelvic
surgery. Thus, nephrotic syndrome and pyelonephritis were
considered the most likely cause.

MCNS occurs frequently in children and is an important
disease in Japan, comprising 38.7% of primary nephrotic
syndrome cases in adults. It responds well to adrenocortical
steroids, and the initial treatment achieves remission in more
than 90% of cases [8,9]. Remission rates in adults with
MCNS are comparable, but complete remission takes longer
in patients 50 years of age or older, as in this case, compared
with younger patients [10]. Further, recurrence rates when
reducing steroid dose are high (30-70%) [8,9,11], underscor-
ing the need for caution during this time.

There are several mechanisms of thrombosis in nephrotic
syndrome, including increased coagulability, loss of coagu-
lation regulatory proteins through the urine, decrease of fi-
brinolytic proteins, and platelet activation. Thrombosis is a
relatively frequent complication in adult nephrotic syn-
drome, occurring in about 25% of patients [1]. Risk is high-
est in membranous nephropathy, but has also been reported
in cases of membranoproliferative glomerulonephritis and
MCNS [1]. Reports of deep vein thrombosis, renal vein
thrombosis, and pulmonary artery and vein thrombosis are
most common, and we could only find 1 other report on
ovarian vein thrombosis [12]. The risk of thrombosis in-
creases in nephrotic syndrome for Alb levels less than 2.0 g/
dL [13]; however, in this case, Alb was 2.4 g/dL, indicating
that the patient was not at a particularly high risk of throb-
basis. Recently, infectious disease has been reported to be a
risk factor for venous thrombosis [14], occurring in 2.6% of
sepsis cases [15]. In addition, Bassilios et al. reported a case
of thrombosis due to acute pyelonephritis, which was also
observed in this case [16]. The mechanism is thought to in-
volve endotoxins or lipopolysaccharides from gram-negative bacilli that promote thrombus formation [16]. Therefore,
thrombus formation in the right ovarian vein in this case may
have been influenced by not only nephrotic syndrome but
also inflammation due to pyelonephritis and sepsis. It is no-
table that the thrombosis occurred only in the ovarian vein in
this case. Previously, Wysokinska et al. reported that the pa-
tients with pelvic infection, as this case, were more likely to
develop ovarian vein thrombosis [4]. Moreover, we consider
that early diagnosis and treatment for not only the ovarian
vein thrombosis but also pyelonephritis and nephritic syndrome led to suppress other thrombosis formation in our patient.

There is no consensus treatment for ovarian vein thrombosis; antibiotics and anticoagulants are generally administered. Anticoagulant therapy should be administered continuously for at least for 3–6 months. Thrombi in the renal veins or descending vena cava should be treated as for pulmonary embolism [4]. Moreover, although inferior vena cava (IVC) filters are usually not implanted in cases of ovarian vein thrombosis, they may be used if anticoagulant therapy is not effective [17,18]. In nephrotic syndrome, thrombosis outside the renal veins should be treated as for deep vein thrombosis or pulmonary embolism, with anticoagulant therapy that begins with unfractionated or low-molecular-weight heparin that is later switched to warfarin [19]. In cases of nephrotic syndrome complicated by renal vein thrombosis, IVC filters are sometimes implanted when anticoagulant therapy is contraindicated [20]. In this case, treatment began with heparin and was later switched to warfarin. Since the thrombus was reduced, an IVC filter was not implanted.

In conclusion, we encountered a case of MCNS complicated by ovarian vein thrombosis. When patients with nephrotic syndrome complain of abdominal pain, venous thrombosis in the abdominal cavity should be considered.

Compliance with Ethical Standards

Conflict of interest: The authors have declared that no conflict of interest exists.

Human and Animal Rights: This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent: The consent of the patient is taken.

References


Ayuko Yamashita et al.: MCNS complicated by ovarian vein thrombosis


