Incidental detection of Bombay blood group phenotype in a patient undergoing Whipple's pancreatoduodenectomy for chronic calcific pancreatitis with pancreatic cancer

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Bombay blood group is a rare blood group found in 1 in 10,000 individuals in India and 1:1000000 individuals in Europe.¹ Individuals with this blood group lack H antigen which is present in O, A, B and AB blood groups. This blood group is sometimes misdiagnosed as O group and result in complications after mismatched blood transfusion.² We present a patient with Bombay blood group who underwent Whipple’s pancreatoduodenectomy for chronic calcific pancreatitis with suspicious head mass.

A 60 year old lady presented to us with severe epigastric pain abdomen radiating to the back for 6 months. She was having oily stool suggestive of steatorrhea. She lost 8 kgs over these 6 months. Her appetite was normal and she was not jaundiced. She was hypertensive and diabetic for 20 years. Physical examination was unremarkable. She was evaluated with Contrast enhanced CT scan, which showed a mass in head and uncinate process of the pancreas with dilated main pancreatic duct (21mm) with calcifications. Her serum CA 19-9 was more than 700 units. Her PET CT showed metabolically active disease involving the head and uncinate process of the pancreas. Her blood group reported in the past record was O Rh D positive. She was taken up for Whipple’s pancreatoduodenectomy after reserving two units O Rh D positive of packed red blood cells.

The blood bank on analyzing the blood sample of the patient determined her blood group to be Bombay phenotype and informed the surgical team immediately during the ongoing surgery and requested to send the waiting family members to the blood bank for blood group and donor screening. Fortunately two of her family members were found to be having same blood group and eligible for blood donation. The surgery was performed with utmost consideration of stringent haemostasis, so no blood transfusion was required during the surgery or in the postoperative period. She was discharged on day 6 without any complications. Her biopsy was well differentiated adenocarcinoma of pancreas in the background of chronic calcific pancreatitis.

The antigens of ABO group (A, B, and H) consist of complex carbohydrate molecules. The expression of A and B antigens is determined by the presence of H antigen on red blood cells. H antigen is synthesized by H gene (FUT1) which is located on chromosome 19 and give rise to glycosyltransferase that add L-fucose to a precursor substance to produce H antigen on red cells.

H antigen is an essential substance to A transferase or B transferase which are encoded by the ABO genes located on chromosome 9.³ A and B transferases convert H antigen into either A or B antigens. In group O individuals, A and B transferases are absent or inactive.

Therefore, H substance persists unchanged as group O. Individuals with Bombay blood group phenotype fail to express H transferase. They cannot synthesize A or B antigens, and ABO antigens are absent from their red cells, regardless of their ABO blood group gene.

An individual with the Bombay blood group may be misdiagnosed as a common O blood group in majority of the laboratories performing blood group testing without using pooled O cells or anti- H lectins. This sort of practice of performing blood group test now needs further evaluation.⁴ Also because of the presence of anti H in their plasma, if they receive O red cells except the Bombay blood group, they may develop an acute haemolytic transfusion reaction.

Though Bombay blood group is rare, it is still more commonly found in India. In O blood group patients blood group testing with pooled O cells or anti-H lectins should be performed to prevent any mishap due to mismatched blood transfusion.

References

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