Case 423

2. Epidural hematoma > 1. Subdural hematoma

【Progress】

He was transported to stem hospital by ambulance where brain surgeon could serve with open craniotomy and hematoma resection.

【Discussion】

Brain meninge is composed of three layers, dura, arachnoid and pia membrane.

Conventionally, subdural hematoma is believed to arise from injury of bridging vein connecting cerebral vein in arachnoid space to meningeal vein in dura, while epidural hematoma arises from injury of meningeal artery running in dural space (1, 2). However, a new theory is supplied about emergence of subdural hematoma, based on no histologic space of subdural area.

Dura is known to be composed of two layers: endosteal layer and meningeal layer (1, 2). Further, dural border cell layer is proposed at the most inner dura, namely the inner part layer of meningeal layer, indicating that dura is eventually composed of three layers: endosteal layer, meningeal layer, and border cell layer (3-7). Border cell layer has abundant capillary networks, called the inner dural plexus. A new theory of emerging subdural hematoma, is that injury of border cell layer with abundant capillary network causes splitting of the layer, causing hemorrhage supra-arachnoid membrane, based on the histologic findings that there are a histologic continuity of arachnoid membrane and dural border cell layer, indicative of absence of real subdural space (3-7). Then, subdural hematoma runs alongside the surface of supra-arachnoid space.

Meanwhile, epidural hematoma is virtually present between endosteal layer and meningeal layer, not existence between extra dural space simply because endosteal layer is firmly fixed with skull bone (3-7). Middle meningeal artery, middle meningeal vein, sinus are present in the gap between layers of osteal and meningeal. Epidural hematoma arises from injury of meningeal artery, meningeal vein, and/or sinus, inducing enlarging gaps filled with hematoma. Endosteal dura layer are thickly fixed with cranial suture ligament, hematoma progress is blocked by the suture ligament, leading to form biconvex figuration. Epidural hematoma is usually associated with cranial bone fracture with injury middle meningeal artery, vein or sphenoid sinuses. Epidural hematoma can be present without skull fracture, especially with injury of transverse sinuses and superior sagittal sinuses.

In our case, left parietal-occipital biconvex hematoma is bordered corresponding with cranial bone suture, probable epidural hematoma without cranial bone fracture. Inner content of hematoma is relatively low attenuation whose CT vales mimic aorta CT values, indicative of relatively fresh hematoma. Since the probable epidural hematoma was associated with mass effect, the patient was transported to the hospital where brain surgical removal of hematoma can serve.

【Summary】

We presented a seventy-six-year-old male presented with paresis of left lower extremities and dizziness. He took brain CT that depicted biconvex hematoma along with skull, indicative of probable epidural hematoma. It is borne in mind that epidural hematoma is formed by injuries of middle meningeal artery or vein or sinus running in the spaces between endosteal layer and meningeal layer that implies that the term of epidural or extradural hematoma is inappropriate but that of intradural hematoma is more appropriate. Further, subdural hematoma arises from injury of border cell layer situated at the most internal layer of dura with abundant capillary networks rather than bridging veins between cerebral vein and venous sinus. Furthermore, because an endosteal layer is fixed with suture septum ligament, epidural hematoma equaling intradural hematoma cannot be formed along with arachnoid membrane but be blocked at the cranial suture and inflated like a lentiform.

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