Briefly explain/discuss the likely short-term (i.e., within a few hours) effect(s) of a small (≤ 10 mm2 in area) tear or puncture in the pleural membrane of one (but not the other) lung on respiratory function.

The pleural membrane is a two-layer membrane which consists in the visceral pleural attached to the surface of the lung and the parietal pleural which is attached to the chest wall. The two membranes are very close to each other and separated by a thin layer of intrapleural fluid which holds the two membranes together by surface tension, allowing simultaneous transmissions of perpendicular forces between them. The fluid provides lubrication for the pleural surfaces on the lungs and chest wall as they slide against each other during the breathing cycle.

In addition, the pleural space helps to regulate the pressure inside and outside the lungs during breathing. If the pleural membrane is punctured since the pressure gradient is negative between the lung and the chest, both blood, air or both can enter the pleural space. Because that air has nowhere to go, it keeps accumulating inside this space and builds up pressure between the chest wall and the lungs.  As the pressure and amount of air in this cavity increase, it compresses the lung further and further, making it unable to expand when breathing.

However, the hole is small so that the intrapleural fluid is leaking slowly and within a few hours after the tear, only a small amount of air is going to be trapped in the pleural space. And the mechanical coupling previously described, is going to be impaired which will cause an increasing chest pain when taking a deep breath and/or a reduced efficiency in breathing (shortness of breath or rapid breathing). Part of the lung has collapsed down.