Since $f \in L_1(0,\infty)$ then $\int_0^{\infty} |f(x)| dx < \infty$. and then

$$\lim_{t\to\infty} \int_0^t |f(x)| dx = A < \infty$$

$$(\forall e > 0)(\exists d > 0)\left(\forall t > \frac{1}{d}\right)\left\{\left|\int_0^t |f(x)| dx - A\right| < e\right\}$$

$$-e < \int_0^t |f(x)| dx - A < e$$

$$A - e < \int_0^t |f(x)| dx < A + e$$

$$\frac{A-e}{t^2} < \frac{1}{t^2}\int_0^t |f(x)| dx < \frac{A+e}{t^2}$$

$$\lim_{t\to\infty} \frac{A-e}{t^2} \le \lim_{t\to\infty} \frac{1}{t^2}\int_0^t |f(x)| dx \le \lim_{t\to\infty} \frac{A+e}{t^2}$$

$$0 \le \lim_{t\to\infty} \frac{1}{t^2}\int_0^t |f(x)| dx \le 0 \Rightarrow 0 \le \left|\lim_{t\to\infty} \frac{1}{t^2}\int_0^t f(x) dx\right| \le \lim_{t\to\infty} \frac{1}{t^2}\int_0^t |f(x)| dx = 0$$

$$\lim_{t\to\infty} \frac{1}{t^2}\int_0^t f(x) dx = 0$$